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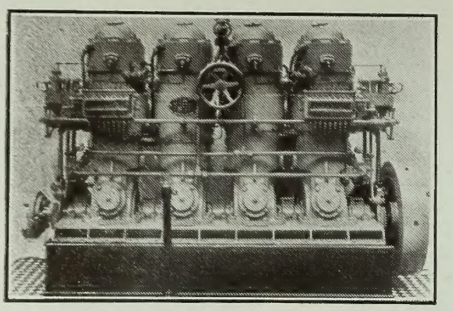

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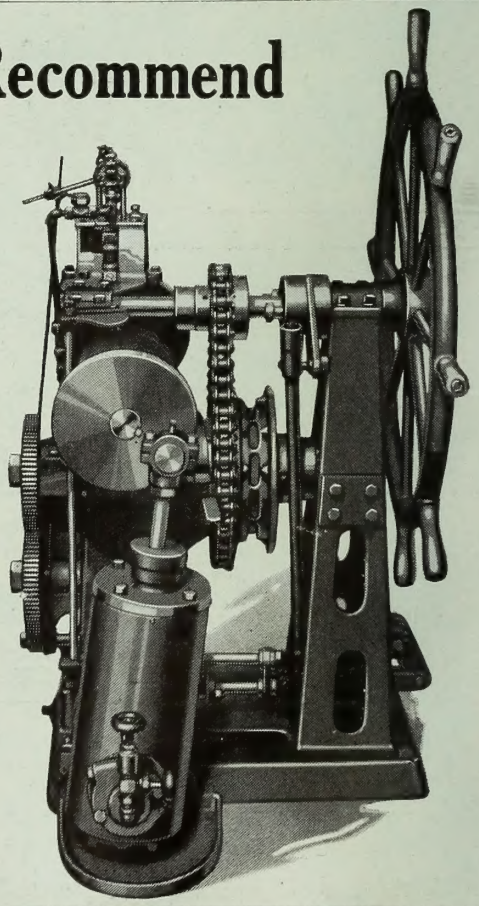

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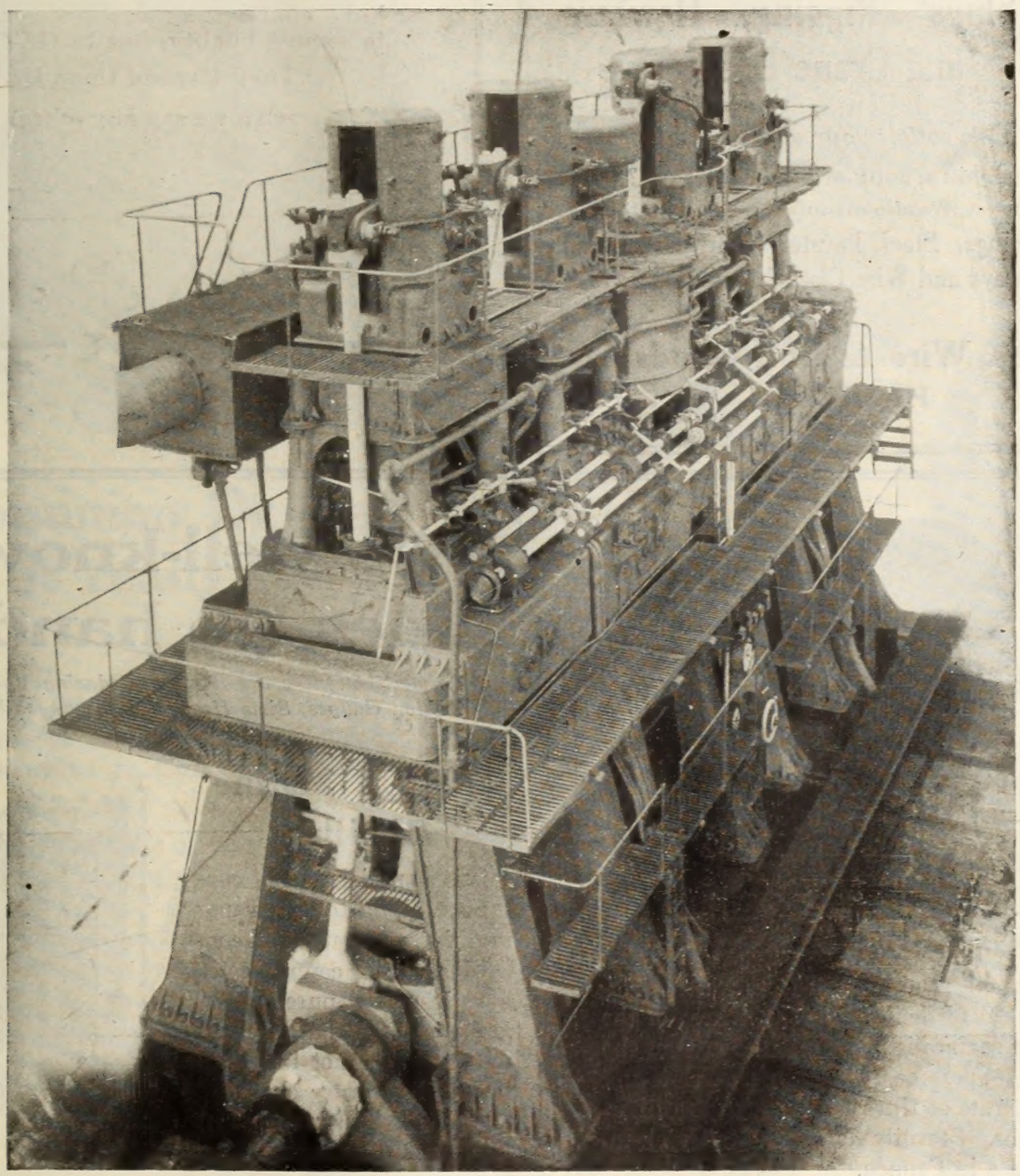

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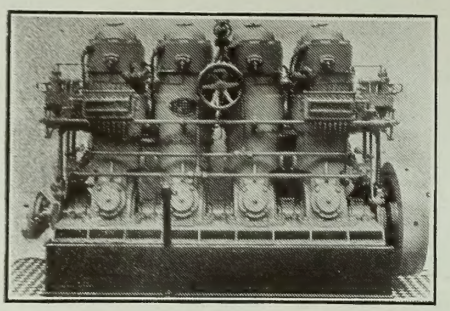

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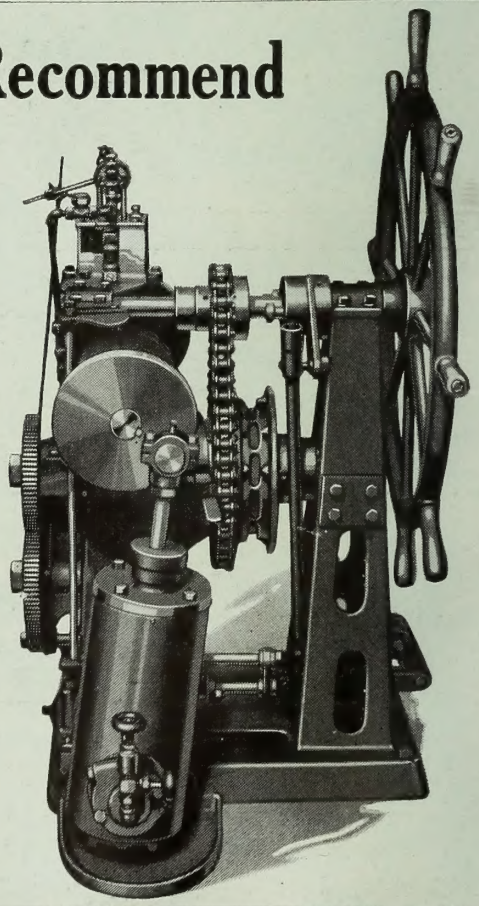

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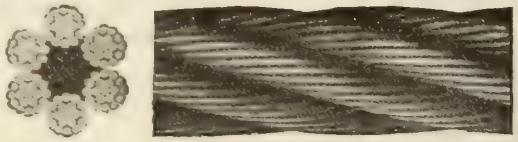

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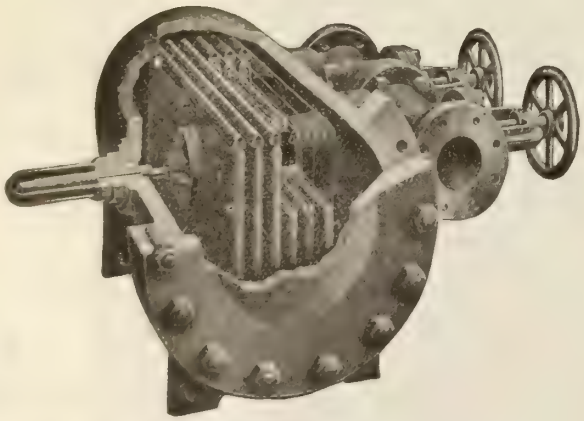

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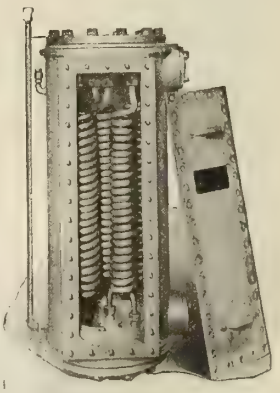

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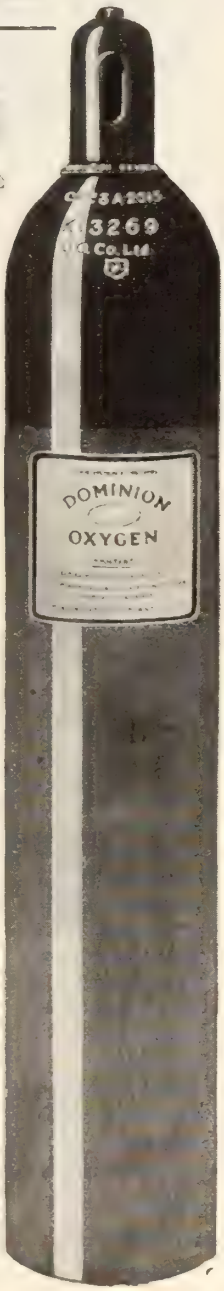

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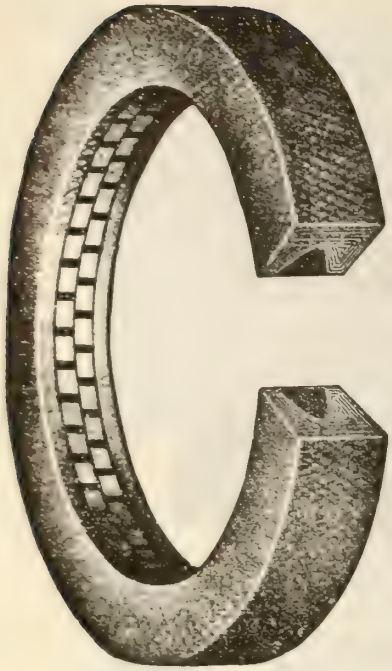

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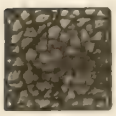

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MARINE ENGINEERING
OF CANADA

Volume XII JANUARY, 1922 Number 1

Trials of the Beardmore-Tosi Engine

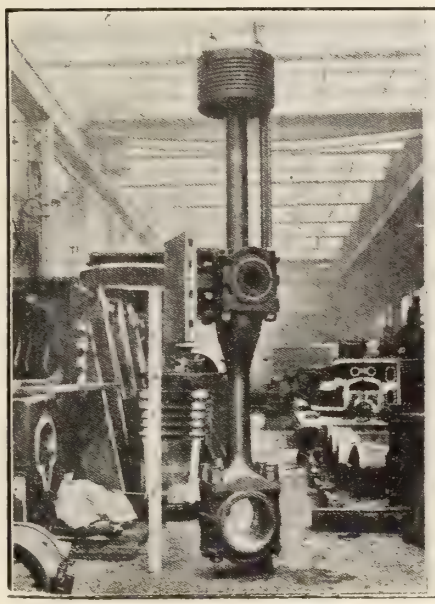
This Firm Have Developed a Four-Cycle Marine Diesel Engine Which Embodies Some Interesting Features of Design—An Account of the Performance Under Trial, and Some Details of Construction Are Given in This Article

"The Engineer," London.

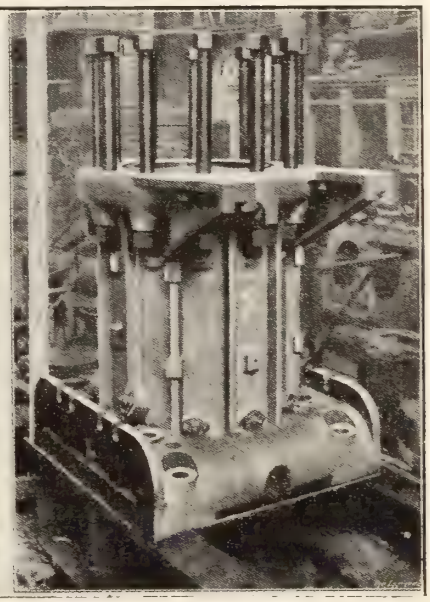
THE POST-WAR development of the slow-speed marine Diesel engine in Great Britain has been characterized by an enthusiasm which bears favorable comparison with the less certain progress which was achieved during the years immediately preceding the war. One of the happiest features of the work of the last two years has been the construction of a number of engines of widely varying types built from both British and continental designs. The experience which is being obtained from the running of these engines in service will undoubtedly lead to a more accurate valuation of the relative merits of each particular type to the elimination of constructional defects, and to the evolution of engines increasingly capable of meeting the high demands of present-day mercantile marine practice.

During the war, the problem of the application of the Diesel engine to merchant ship propulsion was, in this country, largely set aside to make room for the more pressing duties and tasks with which those years were filled. Here and there, however, on the Continent, among our Allies and in neutral countries, some advance was made, and it is satisfactory to see that British builders have been able, by close association and common application, to take advantage of new and ingenious designs and render them still more valuable by imparting that robust construction which is characteristic of our marine practice.

Italian engineers have contributed much to the progress of the Diesel engine, and the engines designed and constructed by the Ansaldo, Fiat, and Tosi concerns have earned a high reputation. William Beardmore and Co., Limited, have the advantage of being associated with Messrs. Tosi Bros., of Legnano, Milan, as regards their Diesel work, and the Beardmore-Tosi engine, which has just completed extensive shop trials, is a striking example of the success of combined effort in the solution of engineering problems and the achievement of successful design. As contractors of both four-cycle and two-cycle engines, Messrs. Tosi Bros. made extensive inquiries into the relative merits of the two types before commencing the design of their marine engine.



Piston and Connecting Rod



Cylinder.

The four-cycle engine was accepted as having a lower mean cylinder temperature, with consequently more moderate heat stresses, enabling a simple design of liner to be used. The fuel consumption was also shown to be slightly lower on the four-cycle engines. Attention was given to the design of a special cylinder cover and valve gear, which, in its present form, goes far to remove the objection sometimes raised against the four-cycle engine on account of exhaust valve trouble and heat troubles with cylinder covers.

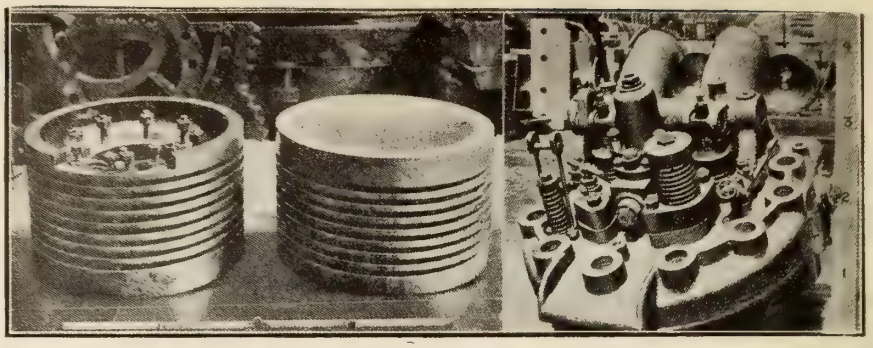
The design and working of the Beardmore-Tosi valve gear will be clearly understood from the accompanying sketches and the valve-tunnel diagram.

In addition to the usual air starting valve, fuel valve and relief valve, each cylinder cover is provided with two combined inlet and exhaust valves, controlled by two "director valves," operated by a simple eccentric on the cam shaft. These director valves act in communication with the air induction pipe or exhaust manifold as required. Thus, as the piston rises on its exhaust stroke with the combined inlet and exhaust valve open, communication is made with the exhaust manifold whilst the induction manifold is shut off. As the piston passes the top centre to descend on the suction stroke the combined inlet and exhaust valve remaining full open, the director valve changes its position, giving communication with the induction manifold. It will thus be seen that although the combined inlet and exhaust valves are exposed to the heat of the exhaust gases, they are immediately cooled by the incoming charge of cool air, and the air current further gives a scavenging effect which sweeps the valve faces clean and prevents any formation of carbon deposit. The excellence of this arrangement of valves was clearly proved on examination of the valves after the 100 hours' trial, when the faces were found to be quite clean. Moreover, the pyrometer fitted at the point where the exhaust gases enter the manifold showed a temperature of about 514 deg. Fah., indicating considerable cooling of the exhaust gases due to the lowering of the temperature of the inlet and exhaust valves and passages by the entering air. The mechanical design is simple and efficient, enabling a robust construction to be carried out in both valves and cylinder head. The director valves themselves are of cast

steel of tee section with a solid spindle, and are so arranged that they do not rub any surface and the power to operate them is practically negligible. The inle , exhaust, fuel and starting levers are of substantial construction and show evidences of careful design.

The fuel valve is of the usual needle type, but so constructed that no packing glands are required and the possibility of sticking is almost entirely eliminated. The valve is so arranged that it can be ground in without dismantling any of the other valve gear.

The cylinder casings are of interesting construction, as will be noted from the accompanying engraving. The cylinder liner, which is of simple design, is supported at the top in such a manner that it may expand freely in the downward direction. Spiral ribs are fitted on the top portion of the liner to increase the velocity of the cooling water and ensure even cooling at the part subjected to the greatest temperature. These ribs also give additional strength. Bottom diaphragm plates provided with stuffing-boxes for the piston-rod and piston cooling tubes are fitted to each cylinder, thus separating the working cylinders from the crank case and preventing contamination of the main lubricating system. The construction used also allows of inspection doors being placed at the back of each cylinder at the base, enabling ready examination of the liners, pistons and cooling tubes to be made whilst the engine is running. The space which is formed at the base of the cylinder when they are bolted together forms an efficient air suction silencer, and is connected by a central pipe to the main induction manifold, which runs the length of the engine at the back of the cylinder covers and is fitted with louvres at the fore and aft ends. This arrangement has the advantage that it prevents any blow back from the pistons vitiating the air in the engine-room. The exhaust manifold is of a very neat design each section of the water-cooled exhaust pipe being supported on feet cast on to the pipe. The pipes are simply clipped to each other and to the cylinder heads by covering bands, which allow the manifold to take up its own position and so avoid any stress due to expansion either on the engine or on the pipe line.

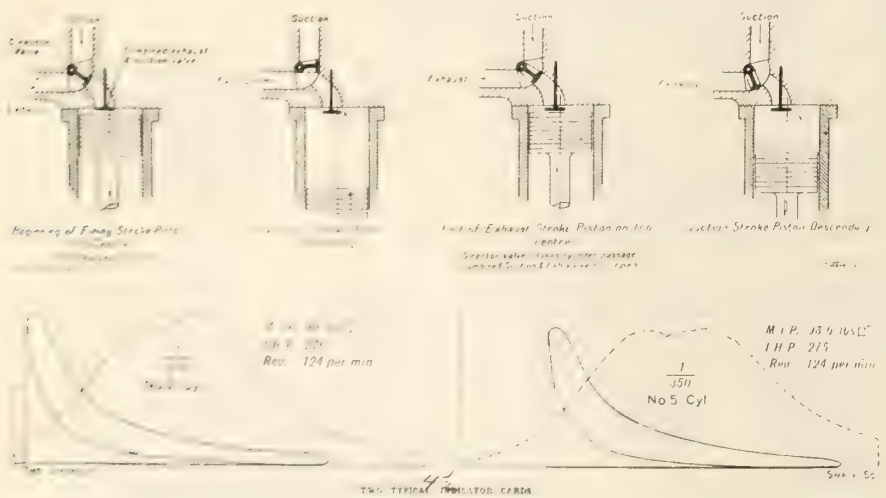


Piston Skirt . Cylinder Head

The construction of the piston and connecting-rod is clearly indicated in the accompanying illustration. The piston itself is of special cast iron, fitted with eight rings of the Ramsbottom type. It is interesting to note that the crown is very thick, varying from 6 in. to 7 in., the designers being of the opinion that the mass of metal helps to conduct away the heat. Fresh water cooling is adopted on the present engines, but there seems to be no reason why sea water should not be used as a cooling medium if so desired.

The connecting-rods are of the usual marine type with cast steel white-metal-lined top and bottom bushes. The general construction of connecting-rods crossheads, columns, crank shaft and bed-plate approach very closely the accepted lines of marine engine design. The columns are of cast iron, and carry the crosshead guides on one side only, allowing easy accessibility for the inspection of the crosshead bearings and telescopic tubes supplying the piston-cooling water. The guides are water-cooled, and visible outlets are provided. The bed-plate, which is in three sections, is of the usual box type construction, and forms, with the columns and the bases of the cylinder casings, which are bolted together, an exceptionally rigid construction, which reduces vibration to a minimum.

The crank shaft is also in three sections each forged from the solid billet. The sections are so designed that in case of necessity one can be lifted and secured and a dummy shaft inserted, allowing two cylinders to be cut out and the other four used. Although an emergency provision, this is an interesting feature of the design. The fly wheel is of the heavy solid rim type, which gives a very low even turning moment and enables the engine to run at very low speeds with regular and easy firing. One of the remarkable features of the trial was the ease with which the engine reversed from full ahead to full astern in seven to eight seconds, and accelerated from a minimum speed of 28 revolutions per minute or retarded to a maximum speed of 130 revolutions per minute, without the slightest tremor or vibration.



Trial Results, Beardmore-Tosi Marine Diesel Engine

Six-cylinder engine. Cylinder diameter 620 mm. (24⅛in.), stroke 975 mm. (38⅜in.), 1250 brake horse-power at 125 revolutions per minute.

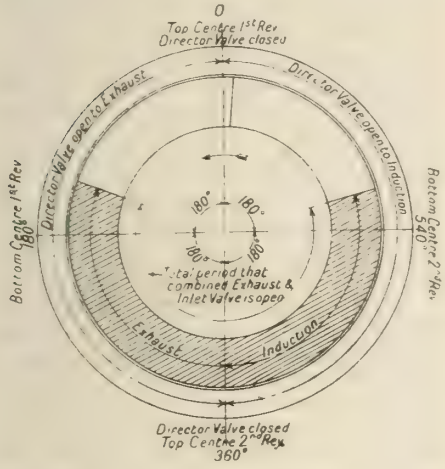
Six Hours' Overload Trial

B.H.P.	1332
Mechanical efficiency, per cent.	75.5
I.H.P.	1766
Revolutions per minute	129.6
Mean pressure on B.H.P. basis, lb. per square inch	76
Fuel consumption, lb. per B.H.P. per hour	.411
Exhaust	Invisible

100 Hours' Trial

Average B.H.P.	1267
Mechanical efficiency, per cent.	77
Average I.H.P.	1646
Revolutions per minute	124
Mean pressure on B.H.P. basis, lb., per square inch	75.5
Fuel consumption, lb., per B.H.P. per hour	.42
Lubricating oil consumption, total for cylinders and loss, gallons per twenty-four hours	4–5
Exhaust temperature, average at exit from exhaust valve, deg. F.	550
Lubricating oil pressure, lb. per square inch	10–12
Circulating water pressure, (jacket) lb., per square inch	10–15
Piston cooling water pressure, lb. per square inch	20–30
Water temperature at outlet from cylinder heads, deg. F., average	125
Piston cooling water, outlet temperature, deg. F., average	130
Blast air pressure, lb. per square inch	1000

The reversing and maneuvering gear, which has been designed by Messrs. Beardmore, is simple in construction, and works with unusual ease. The gear is so arranged that the valve levers are lifted and the cam rollers slide along from the ahead to the astern cams, which stand side by side with the cam shaft. The movement is carried out by a light steel shaft carrying the fingers which engage the rollers. The whole operation is effected by an electric servo-motor, which operates mechanism and clearly indicates on dials at the control station the direction of rotation of the engine and the sequence of starting. The engine starts with three cylinders on air, then three on fuel and three on air, and finally six on fuel, the gear being of the all-round type. All parts of the reversing mechanism are interlocked so that the gear is practically fool-proof and no false start can be made.



Direct Valve Diagram

The control and maneuvering can be carried out by one man, for the valves for blast air and starting air, and the connections with the auxiliary generator engines and auxiliary compressor are all placed within easy reach of the attendant at the control station.

As the present engine will be fitted in a single-screw ship, a complete duplicate blast receiver is fitted, both receivers being interconnected. The fuel pump which is fitted with the usual suction control and cut-out gear, is placed at the front of the engine within easy reach of the control attendant.

The two air compressors fitted at the forward end of the engines are of the three stage design, each compressor being amply large for the full capacity of the engine. Suction air controls are provided on the front of the engine, and guages indicating the pressure in the various stages. The cooling water systems are divided into three, serving the compressors, cylinders and heads, and pistons respectively. Indicators which show when the separate pumps are running are placed at the control station. Forced lubrication is fitted to all parts with the exception of the valve levers, which have grease cups, and indicators for this system are fixed at the front of the engine.

The figures of the 6 hour overload and 100 hour trials here given, with a pair of cards taken during the trial, indicate the excellent performance of the engine. Following these trials a series of demonstration trials were held, which were witnessed by a large company, representing shipbuilding and shipowning interests and the various British and foreign surveys. A noticeable feature of all the trials was the quiet running of the engine, its quick response to control, and the maintenance of an invisible exhaust. The Beardmore-Tosi engine marks a distinct advance in four-cycle engine construction, and its performance in commercial sea-going service will be awaited with great interest and expectation. The first engine will be installed in a single screw vessel, fitted with electrical auxiliaries, the current being supplied by Diesel driven dynamos. The trials of this vessel are expected to be run in a few months, when we hope to have the pleasure of giving further particulars and plans of the arrangement of the machinery in the ship.

THE JOURNAL OF COMMERCE ANNUAL REVIEW

Many eminent engineers and writers express their views in the Journal of Commerce Annual Review of Shipping, Shipbuilding and Marine Engineering which is just published. It is well known that in the industries coming within the scope of the Annual, the past year has been a period of great depression but, as Mr. H. M. Cleminson, general manager of the Chamber of Shipping, remarks in a chapter on the Shipping Outlook, "no one who has been brought into close contact with our shipowners can fail to feel confident in the future of British Shipping."

Professor T. B. Abell, O.B.E., M. Eng., deals with the Trend of Ship Design; he points out that naval architects see the importance of lower production costs in the shipyards and instances the several new forms of ship construction which have been brought out during the year with the idea of combining strength with cheaper construction.

Mr. Hamilton Gibson, O.B.E., M.Eng., M.I.C.E., M.I.N.A., contributes two important articles, the first describing Marine Engineering in 1921—a comprehensive subject of great importance—while in his second article he discusses the merits of the electric drive as applied to steamships. The great strides in motor ship design are reviewed by Mr. D. M. Shannon, M.I.M.E., an authority in this particular branch.

Shiprepairing in these days of specialization has developed into an important industry employing in normal times a vast number of men. Organization plays a large part and the whole of this interesting subject is fully dealt with by Mr. Lancelot E. Smith, O. B. E., chairman and managing director of Smith's Dock Co., Ltd.—one of the largest if not the largest shiprepairing establishment in the world. In spite of the shipbuilding depression many interesting vessels, in many cases embodying novel points of design, have been launched or completed during the past year. They are described by Mr. A. T. Wall, O.B.E., A.R.C.Sc., M.I.N.A., at considerable length.

Shipbuilding in this country, in U. S. A., Japan and elsewhere is reviewed by qualified writers who are in a position to speak authoratively on such matters. The future of the American merchant marine is worthy of considerable attention at the present time and the Annual Review contains the opinions of Mr. Lasker, chairman of the U.S. Shipping Board, in a special interview granted to the New York correspondent of The Journal of Commerce.

A valuable addition is the inclusion of the War Records of British Merchant Ships, a feature which in itself amounts to nearly 80 pages.

Numerous other articles are included and maintain the high standard previously attained by this publication. The price of the book is 3s. 9d. post free, and the publishers are The Journal of Commerce, Liverpool.

SIR RAYLTON DIXON CO., LTD.

The following ships were launched from the above yard during 1921. The "Mount Viso" a steel steamer of 5,450 gross tons for French owners, and the three steel steamers P. L. M. 24, 25, and 26 also for French owners. The total horse power of the vessels launched was 11,800 and the total gross tonnage 24,200.

WIRELESS RANGES

The following ranges were recorded by the C. G. M. M. "Canadian Conqueror" on a recent vogage from Australia to New Zealand. The "Canadian Conqueror" is fitted with a standard Canadian Marconi 2 K. W. transmitter and Receiver type 2846A.

Received Time Signals for Chronometer Rating from Hector Observatory, Wellington, New Zealand, at a distance of 1,800 miles.

Note:—This Station—Wellington—is fitted with a 2½ K. W. transmitter.

Handled traffic to Auckland at a distance of 1,200 miles and also relayed for R. M. S. "Athenic," which was 850 miles astern.

Note:—This Station—Auckland—is fitted with 2½ K. W. Transmittter and single valve Detector Receiver.

Handled traffic with Sydney, N. S. W. in daylight at a distance of 450 miles.

Note:—Sydney has a 5 K. W. Set.

Handled traffic with Awanui, N.Z., at a distance of 1,000 miles when between Adelaide and Wellington.

Note:—Awanui fitted with 2½ K. W. Transmitter and Single Valve receiver.

Communicated with S. S. "Port Napier" about 1,100 miles.

Communicated with S. S. "Marama" about 1,300 miles.

Communicated with several other ships at ranges around 800 miles. being generally informed that the Note and Strength of Signals were good.

The Principle of the Reaction Turbine

The Chief Points Of The Steam Action In The Fixed And Moving Blades of Sir Charles Parsons' Turbine Are Explained, And Also The Construction From A Mechanical Standpoint

By F. K. Skivington, A.M.I.E.E.

Read before the M. E. Section of the Junior Institution of Engineers.

THE ENGINEERING community in particular, and the public in general, are indebted to Sir Chas, Parsons for the invention of the reaction turbine and its subsequent development. It is the chief aim of this paper to bring forward the salient features and points of interest of this invention.

This success is traceable in a great measure to the sound first principles which the inventor has applied in evolving the modern reaction turbine as we know it, and it is now proposed to deal briefly with these first principles.

As everyone knows, steam forms the medium by which the potential energy of the coal is passed on to the prime mover. The production of mechanical power from the heat available in the steam depends upon the conversion of the heat energy into kinetic energy, and the ensuing conversion of this kinetic energy of the steam to mechanical work done on the turbine shaft.

Here are two definite operations to be performed in the turbine; it will be seen that both are not only performed, but also combined with wonderful ingenuity in the Parsons reaction turbine.

Dealing with the two operations separately; the first is carried out by passing the steam through the openings between suitably shaped and spaced blades, fixed in a row round the inside of the turbine casing or cylinder. This results in a velocity being produced which represents a small proportion of the available heat in the steam, converted into kinetic energy, and which is also accompanied by a small drop in pressure across the row of blades.

The second operation—the conversion of this kinetic energy of the steam to mechanical work done on the turbine shaft—is performed by impinging the jets of velocity steam upon a further row of blades, exactly like that mentioned above, except that now the individual blades are set in the opposite direction and are mounted on the turbine shaft or spindle. The shape and setting of the moving blades are such that the kinetic energy of the incoming steam is transmitted to the blades, and in turn to the spindle to which they are fixed. It is at this point that we come to the combination of the two operations.

It has just been seen how the second operation is carried out in the moving row of bades. Now if we consider only the relative motion of the rows of blades we can for the sake of argument consider row A as moving backwards and row B as stationary. From a velocity diagram it is seen that the steam would enter row B in a direction parallel to the axis of the turbine and with a comparatively small velocity. On account of the shape, spaceing and setting of the blades in row B, operation No. 1 is carried out, again accompanied by a drop in pressure across the row of blades. This drop in pressure corresponds to the amount of available heat which is converted into kinetic energy in row B. If row B were fixed, as we have supposed, this kinetic energy would pass on in the steam to row C. But actually row B is moving forwards and the steam discharged from it is comparatively still.

It will therefore be seen that the kinetic energy found in row B from the heat corresponding to the drop in pressure across that row is immediately transmitted to the blades. It is in fact transferred from the steam to the blades continuously, as it is formed, with the result that the steam does not actually acquire the velocity (though relatively it does) which it would do were row B fixed. This constitutes the "Reaction Turbine Principle," the absorption by the moving blades of the kinetic energy of the steam as it is formed. This is what happens when expansion is made to take place in the revolving blades, the driving torque is due to the reaction of the steam jets issuing from them.

It has already been seen that the kinetic energy generated in the steam when passing through row A was converted into mechanical work done on the moving row of blades. It is obvious that the amount of work done on row B is derived from the energy given out in row A and row B. There is therefore converted into mechanical work on the moving row of blades an amount of kinetic energy corresponding to the sum of the heat drop across the row of fixed and the row of moving blades minus the losses. The losses consist of friction and leaving kinetic energy; the latter being passed on to the next pair of fixed and moving rows.

A compound reaction turbine consists of a series of such fixed and moving rows of blades or simple turbines, the sequence of operations explained above being repeated in each pair of rows. To allow for the expansion the height of succeeding sets of rows is increased gradually at first, but more and more rapidly towards the exhaust end of the turbine on account of the rapidly increasing volume of steam at low pressures. The diameter of the shaft is also increased in steps towards the exhaust end, so that a larger passage area may be provided for the steam without having to fit unduly long blades.

Blading Arrangement and Construction

In a Parsons reaction turbine the fixed and moving blades are fitted securely in grooves cut in the inside surface of the cylinder and turned in the curved surface of the spindle respectively in the correct relative positions. The blades are spaced and kept in position by means of suitably shaped packing pieces, which fill the groove, but do not prevent the passage of steam between the blades. The packing pieces also ensure the correct angle or setting of the blades, a highly important factor which affects the capacity of the turbine for steam, whilst the blade profile is a very important factor affecting the efficiency and, therefore, the load which can be derived from that steam.

The methods of fixing reaction blading have varied and improved as the turbine has developed. These improvements have been evolved as the capacity for one turbine unit and the peripheral speed of the blades have increased, together with increase in steam pressure and temperature. The increasing capacity per unit has involved the use of blades of larger and larger size, while the centrifugal force due to the high peripheral speeds which are now attained necessitate an extremely secure anchorage for each blade. It is also necessary to make the highly stressed blade at the exhaust end of the turbine of special metal which is very strong in tension, in order to prevent their breaking off at the roots.

It was the practice for many years to make all the blades and packing sections of brass, the sections being of a very soft alloy. Copper was also used to a great extent for the blades of the first few rows as it withstood high temperatures better than brass. Now, however, steel is often used, as blades of this material can easily be drawn with a really good surface and with sharp edges.

The old method of fixing the blades has been modified, one improvement being what is called "rosary assembly." In this method the caulking pieces and the roots of the blades have small holes drilled in them. A number of blades and sections are threaded on a suitable wire, and at the same time are lined up in a "former" corresponding to a portion of the groove in cylinder or spindle. The ends of the wire are brazed up when the blades and caulking pieces on it have been well pressed together. The whole of the blading of a Parsons reaction turbine may be formed up in

this way, and afterwards fitted into the grooves with the minimum of time expenditure. This method is extremely useful in the case of spare blading, which may be kept in stock for perhaps years, but which may be required at a moment's notice, and should be suitable for being fitted with the greatest possible speed.

The well-known Parsons End Tightened blading is a development of the rosary assembly method as far as fixing is concerned, which, however, is not its chief feature. The latter will be dealt with later. End-tightened blading is rosary assembled on a wire in the manner described above, but for reasons which will be explained later, the packing pieces between the blades are not suitable for being radially caulked into the grooves. In this case the grooves are made rather wider than necessary to take the formed segments, and the small extra space is filled by thin locking pieces of soft brass, which are serrated on one side and inserted circumferentially and driven up. These hold the segments very securely. It is usual with end-tightened blading to machine one side of the packing pieces in such a way that ribs are formed which exactly fit into the serrations in the side of the groove.

The chief feature of end-tightened blading is the large radial clearance that is obtained between revolving and stationary elements, with a fine axial clearance, and that with complete safety of the blading, as the construction of the shaft is such that there is no longitudinal vibration. The amount of the axial clearance can be adjusted by moving the turbine spindle by means of suitable but simple gear in an axial direction. The clearance is reduced by drawing the spindle towards the steam inlet end. This gives rise to the name "End Tightened Blading."

The necessity for a small clearance at the tips of the blades is obvious when we consider the pressure difference across each row. The necessity is greatest at the high pressure end, where the blade height is small. Here the safe limit of ordinary blade tip clearance will give a much higher percentage leakage area than at the low pressure end; hence the end-tightened blading is fitted for the high presure half of the turbine only in the case of a large unit. For very small turbines its use is justified throughout the whole length of the steam path.

The small clearance of end-tightened blading is obtained by fitting a shrouding strip over the tips of the blades, one side of which is flush with the edges of the blades, while the other side juts out beyond the blades about ½ in., and is thinned to a fine edge. The clearance space is between this fine edge and the roots of the adjoining row of blades. The packing pieces between the blades stand out above the surface of the spindle or cylinder, and form the counterpart of the end-tightened joint. The shrouding is fixed to the blade tips in a very secure manner in the process of rosary assembly.

The tips of the large blades at the low pressure end are thinned to an edge, so that they would not be damaged if for any reason contact was made with the corresponding fixed or moving surface.

Flow of Steam

As regards the flow of steam for reaction turbines the velocity of the steam is comparatively small. This has the effect of keeping the losses due to fluid friction remarkably low, and at the same time eliminating erosion of the blades. In a medium-sized or large Parsons turbine it is possible to design for a velocity ratio of 0.9, i.e., the blade speed being 90 per cent. of the steam velocity. It is found by experiment that a figure of this order gives the best efficiency. For theoretical reasons the efficiency should fall off if the velocity ratio is increased beyond this limit, and experiment appears to confirm this.

When the steam leaves the moving row of blades in any simple turbine of the series there is a loss, represented by the kinetic energy of the steam at that point. The leaving kinetic energy is, however, carried on from stage to stage; that for the last stage being thrown away to the exhaust. In a well designed turbine this throw away loss is very small unless the vacuum is particularly high. Elaborate and expensive devices have been used by some turbine builders to improve the efficiency of the exhaust end of the turbine and also increase the capacity with very high vacuum, but it is doubtful if the expense and complication is justified.

General Design

The construction of a reaction turbine is very simple compared with a reciprocating steam engine or an oil engine.

The turbine spindle is now usually made from a single solid forging, machined all over, and often carved out at certain points in order to reduce weight and improve the stress distribution. Large turbines of only moderate speed frequently have the exhaust end of the spindle built up to the required diameter with discs, these being bored out and shrunk on to a portion of the solid forging of the body of the spindle, which has been turned down to a convenient diameter. These discs have their sides slightly recessed or carved out to improve the stress distribution, and are also each provided with a key-way in the bore to fit over a key set in the spindle. Provision is made at the ends of the spindle for attaching small balancing pieces, which may or may not be required when the process of balancing is carried out. The cylinder of the turbine is of cast iron throughout, unless the temperature of steam exceeds 450° F. If the temperature of the steam to be used exceeds 450° F. the portion of the cylinder which is subject to that or higher temperature is made of cast steel. Cast iron is unsuitable where the temperature is higher than 450° F., on account of the peculiar phenomenon called "growth." The transverse joint in the cylinder where the steel portion ends and cast iron begins is made by two circular flanges of ample proportions cast with their respective sections and bolted together.

A gland is provided at each end of the cylinder to prevent the entrance of air, and is usually of the carbon ring type. A small supply of steam is led to the centre of each gland to ensure the elimination of air leaks.

A thrust block is provided at the high-pressure end to take up any unbalanced end pressure, and also to fix the exact position of the spindle relatively to the cylinder. It has been seen that the position of this thrust block is adjusted to regulate the axial blade clearances with end-tightened blading. It consists of several small pads suitably held in a spherical-seated carrier, and faced with white metal, which bear against a substantial collar on the shaft and forged solid with the latter. Each pad is pivoted so that a wedge of oil is drawn in between its face and the working surface of the collar. Any slight want of alignment of the shaft will not affect the efficiency of the thrust block owing to the spherical seating of the pad carrier.

The bearings of a large turbine are made in halves, split horizontally, and are of cast iron lined with white metal. A plentiful supply of oil is required on account of the high surface speed of the journals, and this is supplied by a rotary pump which forms part of the rotary bine unit. The oil is circulated through the lubrication system as follows:—

The pump forces the oil at a pressure of about 5 lbs. per square inch through an oil cooler of the surface type, where the heat equivalent to the bearing losses of the plant is extracted, and thence through distributing pipes to the bearings and thrust block. The oil passes out at the ends of the bearings down into wells formed in the framework of the castings, and from these by drain pipes to the settling tank or sump. An outlet or suction branch is fitted on the side of the settling tank and is provided with a strainer which acts as a safeguard against light foreign bodies, being drawn up by the pump. This outlet branch is connected to the suction side of the oil pump, and completes the circuit.

The turbine shaft is connected to the machine to be driven by means of a flexible coupling. This permits of independent end-play of the former or of the revolving element of the latter. It also nullifies any bad effect or a slight want of alignment between the respective revolving parts. The working faces of the coupling are lubricated by the oil discharged from the adjacent bearings.

Types of Reaction Turbines

All the foregoing remarks have applied to Parsons reaction turbines using high pressure steam and exhausting to

a condenser at a vacuum. Other types are, however, built, such as:—

(a) Low pressure reaction turbines.
(b) Mixed pressure reaction turbines.
(c) Back pressure reaction turbines.
(d) Pass-off presure reaction turbines.

(a) A low pressure turbine is one in which exhaust or low pressure steam only is used. The steam supply is generally obtained from the exhaust of non-condensing reciprocating engines, the turbine expanding this to as high a vacuum as possible and doubling the output of the steam engine for the same coal consumption.

(b) The mixed pressure type is a combination of a high pressure and a low pressure turbine, and is designed for using either high pressure or low pressure steam or both at once. In this case the steam is expanded to a vacuum as in (a).

(c) A back pressure turbine uses high pressure steam, but exhausts at or above the pressure of the atmosphere. Such turbines are not frequently required in comparison with the standard type exhausting to a vacuum. They are extremely useful, however, in cases where large supplies of low pressure steam are required. In this case a condenser is not required and the size of the turbine is comparatively small for the power developed.

(d) In this type provision is made for automatically passing off a supply of steam of suitable quantity and pressure at an intermediate stage in the turbine. The steam may be tapped off at one or more points, depending on whether steam at one or more pressures is required.

GERMAN MOTOR SHIPS

The Hamburg-America Line's new fleet of motor ships has been inaugurated by the maiden voyage of the Havelland, a vessel of 10,235 tons.

This vessel is propelled by twin high-powered four-cycle type submarine Diesel-engines driving slow-turning propellers through reduction gears. The original power of the engines was 3,000 shaft horse-power each at 390 r.p.m. on a weight of 15 tons, but their running speed has been reduced to 230 revolutions. As the reduction gear has a ratio of 1 to 2.7 the propeller speed is 65 per minute. At the speed in question the main engines now together develop 3,300 shaft h.p., or nearly 4,500 i.h.p., the piston speed being 798 feet per minute. Each engine has ten cylinders 530 mm (20,866 in.) bore by a stroke of the same dimensions. For reliability and durability the mean indicated pressure has been reduced from 117.8 to 102.2 lbs. per square inch. By suitably proportioning the engine-room, an additoinal space of 18,000 cub. feet can be gained.

On her maiden voyage her engine-room record showed her engines together developed an average of 3,603 i.h.p. on a mean fuel consumption of 136 grams per indicated horse-power-hour, or 0.299 lb. From this, presumably, at least 5 per cent. must be deducted for the loss of power in the reduction gears.

The principal dimensions of the ship are:—

Deadweight capacity	10,235 tons
Fuel capacity (double bottoms)	1,400 tons
Fresh water	200 tons
Speed (loaded)	12 knots
Cubic capacity of holds	10,846 c.meters
Power (indicated)	4,500 h.p.
Daily fuel consumption	16 tons
Weight of machinery	250 tons
Length (O.A.)	465 ft.
Breadth (M.D.)	58 ft.
Depth (M.D.)	29 ft. 6½ in.
Gross tonnage	6 308 tons
Net tonnage	3,829 tons

The ship is of the well-deck type with long poop and forecastle; she has two continuous steel decks and is built to the highest class of the Germanic Lloyd. There are eight water-tight bulkheads extending to the main deck. Accommodation is provided for 12 passengers.

Her two main engines were built during the war at the Augsburg works of the Maschuiien-fabrik Augsburg-Nurnberg, for submarine cruisers. The firm of Blohm and Voss is licensed by this firm to build these engines and has already built some, of which two have been in use in its power plant for several years.

Reduction Gearing

The important question of perfect operation of reduction-gears between engine and propeller was thoroughly investigated on the test-stand, says the Motorship, using gears of actual size. In this connection, it became necessary to offset the negative turning moments, which occur with oil engines, and are especially great in the neighborhood of the critical speed, in order to prevent excessive wear of the gear teeth. This end has been attained in the installation in question, not by the addition of separate and often unreliable elements, but by proper proportioning of the transmission shafting and a suitable distribution of revolving masses or balance weights.

During the trial trip, by means of special apparatus, the twisting moments in the shaft, fore and aft of the reduction-gears were measured photographically; this measurement revealed a uniformity of twisting moment in the shaft on a par with that of a turbine installation.

All auxiliary machinery, including the steering engine and the 13 cargo-winches, are electrically driven. Two 3-cylinder oil engines developing 180 h.p. each, and coupled to 95 k.w. dynamos, are provided; the voltage is 220. In addition, each engine is connected through a clutch coupling to a compressor, intended for furnishing starting-air during prolonged maneuvering Under ordinary circumstances the compressors directly connected to the main engines are sufficient to supply the starting-air. The starting-air is stored in eight containers having a combined capacity of 226 cubic feet under a pressure of 880 lbs.

A small compressor driven by a hot-bulb surface-ignition motor of about 5 h.p. is provided for the initial filling of the tanks for the auxiliary engines. The lighting circuit has a voltage of 110, and the power therefore, is generated by an 11 k.w. dynamo driven by a hot-bulb motor.

The following are also provided:—

2 main cooling-water pumps.
2 cooling-water discharge pumps.
1 auxiliary cooling-water pump.
1 oil-receiving and ballast pump.
1 fuel-oil pump.
2 lubricating-oil pumps.
2 fire-pumps.

During the voyage and in cold weather the engine-room, tunnel, and also the quarters are heated by hot air, utilising the exhaust gases.

The sister ship to the Havelland is the Munsterland. Blohm and Voss also have an order for eight additional motorships from the Hamburg-American Line, of which several may have double-acting Diesel engines.

THE NEW CUNARDERS

A few days before Christmas the first pictures of the five new Cunard liners, which are to re-open a Cunard service to Montreal next spring reached the offices of their local agents, The Robert Redford Company. The photos show passenger liners of a very pleasing design. They have a single funnel and will be of a typical 14,000 ton oil burning liner of this line

This particular type of liner has been especially designed and developed for the St. Lawrence river route. A few departures in the names of these liners is noted. Some of the names of the pre-war favorites, such as "Andania," "Alaunia" and "Ausonia" have been perpetuated in the new vessels, while the other names, which are newer are "Tyrrhenia," and "Antonia." With this complete fleet of up-to-date liners, the Cunard officials are confident that the business built up in pre-war days will be recovered in a very short time.

Liverpool, Glasgow, Southampton and London are to be served by the new liners from Montreal, and with the "Albania," another new Cunarder, a weekly service will be maintained out of Montreal. This means that there will not be a week-end in Montreal port next summer that does not see the arrival of a large Cunard liner and the departure of another. The liners have a very attractive passenger accommodation and in addition are useful cargo carriers, where express ocean freight is in demand.

The Solid Injection Oil Engine

There is Quite a Difference of Opinion Between the Protagonists of the Solid Injection and the Air Injection Oil Engines—The Result of Practical Experience With the Solid Injection Type is Told in This Paper

By C. McTaminey

Transactions of the Institute of Marine Engineers.

I WAS VERY interested to read the paper by Mr. David Peel on solid injection Diesel engines published in the proceedings of February last, and as the subject seemed to be of great interest to the members generally, I thought that perhaps some information bearing on the use of solid injection in larger engines might be appreciated, as Mr. Peel's paper dealt more particularly with the submarine type of engine. Having been from May, 1917, till quite lately, in charge of the machinery of the Trefoil, an oil tanker running as a Royal Fleet Auxiliary under the Admiralty, I gained considerable first-hand experience of the running of these larger engines.

The main engines of the Trefoil are of the four-stroke cross-head type, the vessel being fitted with two Vickers' engines, each of eight cylinders and together developing 1,500 brake horse power at 150 revolutions per minute. The vessel herself carries 2,000 tons of fuel as cargo on a displacement of about 4,510 tons, her speed being 11.5 knots at full power, and capacity of bunkers 213 tons.

These engines, it may be interesting to note, are the second pair made for the Trefoil, the first pair built for the ship having been diverted to the monitor, Marshal Soult, one of the ships hastily constructed for work on the Belgian coast. The Trefoil was fitted with a replace pair of engines, by the same makers, generally similar to those in the Marshal Soult, but with minor improvements.

The original engines formed one of several Diesel marine installations which the Admiralty ordered before the War so as to obtain a comparison of the sea-going merits of the different makes which were on the market. They are not pure commercial engines, as with an eye to development for Warships, it was arranged by the Admiralty that they should be of the low head-room type, and the construction was based on the use of a stepped bedplate—as is common in warship work—together—in the Monitor at any rate—with forged columns braced somewhat as in torpedo boat construction, but on a larger scale. As a matter of fact, the second pair of engines had cast columns on the inboard side in order to cheapen cost and facilitate construction, it not being necessary to repeat the experiment in the second pair of engines.

General Description

The cylinders are very elementary in form, as they consist of a steel fore and aft entablature into which the cast iron liners are dropped, the extension of the liner through the bottom of the entablature being covered by a welded plate jacket to the underside of the entablature, and made watertight at the bottom by a pair of rubber rings. The covers are shallow and of cast steel, the valve boxes being separated very much on the submarine lines. The gas joint between cover and valve box is a coned one, metal to metal, the water joint above it being a sliding one made with a pair of rubber rings. The reversing gear is rather out of the ordinary for Diesel engines, consisting of a pair of bell cranks for each valve, these bell cranks being mounted on oppositely disposed eccentrics on a fulcrum shaft. According to the position into which this fulcrum shaft is turned, one or other of the bell cranks engages with the cam below it, and thus gives the correct functions for ahead or astern running as the case may be. From the bell crank which happens to be in action the motion is carried to the valve by means of a lever by the bell crank and connected by a pull rod to the lever on the valve box.

The fuel cams are mounted in sliding blocks on the cam shaft and while the fulcrum shaft is being turned through 180° these blocks are slid along the cam shaft, putting, say, the ahead cam out of action and bringing the astern fuel cam under the fuel valve tappet. A somewhat similar arrangement is used for reversing the air starting valves, which are arranged in one box from which pipes are led to the separate cylinders through a non-return valve at each cover. The gear is operated by an air ram, the movement being steadied by an oil ram acting as a dashpot.

The cylinders are 17 in. diameter with a 27 in. stroke and the pistons are not water-cooled. They ran quite comfortably even under a considerable overload. In passing, I may say that in the engines of the Marshal Soult with whose working I am well acquainted—being friendly with her ex-Chief Engineer Lt.-Commdr. Baker, D.S.O., who has recently relieved me in the Trefoil—there was considerable piston heating at times, in fact the lubricating oil on occasions caught fire though it was never necessary to stop the engines on account of defect throughout the war. This fact I see was mentioned in the discussion arising out of Mr. Peel's paper. The heating had nothing to do with the system of injection, however, being simply caused by the fact that as the vessel often had to sit on the mud, the suctions became choked and the engine did not get any circulating water till the ship had left her moorings and had run for a little time properly afloat. A steam ship, as we all know, would have corresponding trouble—with condensers for instance—in similar conditions. The remedy was to fit a special sea suction as was afterwards done and as is also done for steam ships in the same circumstances.

Maneuvering Features

The Trefoil was delivered in May, 1917, and after a very satisfactory sea trial we proceeded to Liverpool, where from August, 1917, to October, 1918, we were engaged in and around Liverpool and Manchester docks and running up and down the Canal with occasional runs to Lough Swilly, Bantry Bay and the Clyde. Being a twin screw ship we relied upon our own maneuvering powers in the Docks and Canal to a greater extent than if we had been a single screw steam vessel, and, as may be imagined our reversing gear had a very thorough test, telegraph orders in the early days coming down sometimes in such quick succession that it was almost impossible to register them in the log. The ability of the oil-engined ship to go astern at full speed, almost immediately, and its possession of what might be regarded as a full head of steam, a full vacuum, and heavy fires at instant call, was fully brought home to me on many occasions and there is no doubt that in the canal and docks we carried out, unaided, many evolutions which would have resulted in piling up a steamship which had attempted them. We had no hitch at any time with the reversing gear and though we suffered from constant changes of junior engineers the new men soon picked up the running of the engines and after a very short time were quite competent to handle the engines. Judging from my previous experience with air injection oil engines I can say that in the Trefoil the solid injection engines started, if anything, more rapidly and more smoothly than did the other type. When a number of engine reversals were required we started one or sometimes both of our air compressors to keep our starting reservoirs charged. As the compressors were not in use on other occasions they gave us no trouble, there being ample opportunity of examining and refitting the valves before they became troublesome. There is no doubt that the reversing of oil engines is a matter which has been satisfactorily

settled in this, as in many other Diesel designs, and that the fears often felt in this connection are not now justified. It stands to reason that the gear must be kept in order, as in the case of any other apparatus, but in the Trefoil's engines the mechanism was easily understood and was readily accessible, so that a little intelligent interest was all that was required to keep the gear up to concert pitch.

The Air Compressors

The compressors were two in number, each three-stage, and were driven by Vickers' solid injection engines, the air being stored in six riveted air reservoirs. We found it was necessary to keep these reservoirs well drained, otherwise pitting began. The reservoirs were about 2 ft. 6 in. diameter by 11 ft. long with a manhole door at the end, so it was quite easy to examine the interior and to keep them in good condition. This type appeals to me more than did the long narrow bottles used in some other ships I have seen, as I imagine that the insides of the latter are likely to suffer owing to the greater difficulty of inspection. The maximum pressure of air was 600 pounds per square inch, but everything was quite in order as long as we had a pressure of 250 pounds. We usually kept a reservoir charged, and shut off the main air line for use in starting our compressors in case of an emergency such as a leaky joint, but as a matter of fact, we were always able to obtain plenty of air and had no need to fall back upon our reserve. The engines, as I said, started very quickly, especially when warm, and I can quite believe that the absence of the injected air, which must have a cooling effect upon the charge, accounts for the easy starting from cold. The only precaution to be taken is to prime the fuel system thoroughly with the hand pump, if the engine has not run for several days, or if the fuel piping has been disconnected for any purpose. If this is not done it is plain that considerable starting air may be used in driving the engine simply to pump the air out of the fuel system. I know of a case where owing to neglect of this elementary precaution, a ship ran twice out of air before the main engines were got going. This took place in an air injection installation where there is the liability of air locks occurring in the fuel piping, owing to the injection air being coupled to the fuel system.

The Fuel Pumping

On each of the Trefoil main engines there are two fuel pumps, each consisting of a two-throw pump driven by spur gearing from the cam shaft. The diameter of the plungers is .75 in. and the stroke 1.5 in., the pump running at engine speed. The design of the pump is broadly speaking, similar to that of the ordinary Diesel engines, though owing to fuel pressures of 4,000 pounds being used the parts are more massive. The eccentric straps in particular are very wide and are white metal lined.

Both suction and discharge valves of the fuel pumps are in duplicate, the two suction valves being almost in contact so that the suction valve control affected almost together. A vent valve is fitted below the upper discharge valve. The output of the pump is varied by a hand lever which raises or lowers the fulcrum of a sway beam to each pump, one of which beam is operated by the plunger motion, while the other, which is fitted with an adjustable tappet holds the suction valves off their seats for a longer or shorter portion of the stroke of the pump according to the position of the control lever.

The pumps discharge to a fuel main which is a pipe running the length of the engine and fitted with leads to each spray valve, the latter being a cam operated spring loaded valve, similar in general principle to the ordinary Diesel valve, though there are no pulveriser and flame plates or injection air connections. The fuel passes from the spray valve and when the spray valve is opened by the fuel cam the fuel passes through the spraying nozzle to the cylinder. The nozzle is a simple affair consisting of a ball end in which are drilled 5 holes, each about 19-thousandths of an inch in diameter and counter-sunk on the outside. The nozzle is made of tool steel and stands up very well to its work, though eventually the holes become eroded by the passage of the fuel. The nozzles are small items, easily replaced, and as they last about 12 months, fitting a spare is a trifle. I know there was considerable experimenting carried out by the makers before the right proportions of the spraying gear were discovered, but from the sea-going point of view the whole system is almost ridiculously simple. All one had to do was to adjust the pump control lever to give the required pressure in the main and then it would remain constant for hours. Now and then a touch on the lever might be necessary to bring the pressure gauge pointer back to its exact position on this dial. When altering speed the opening of the spray valves was altered by a second lever and the pump control afterwards adjusted if necessary.

The spray valve is, of course, the soul of the job as it determines the fuel admitted and it must, therefore, be kept perfectly tight. This, however, is easily done and all that is required is care and an interest in the job. We made it a practice to touch up the valves about every month and to give the valve a rub into the seat using a little crocus powder or rotton stone. Afterwards the valve was fitted to a hand pump and tested to full pressure to see it was tight and that when the lever was tapped by a mallet the spray from each hole was clean and that the valve shut off sharply and without dribble.

Our valves had no external gland on the spindle as there was a bell crank inside the valve box for lifting the spindle and the gland was on the bell crank shaft which turned in the gland—the fuel load on the bell crank being taken up by a ball race inside the gland. The glands of the spray valves and of the pumps are packed with soft packing. We generally used Palmetto packing with a turn of Parametto packing which is a bit harder, or a leather ring at the top and bottom of the stuffing box but most soft packings will do. The Tuck's type of packing maye be used as long as there is no india rubber core which would be affected by the fuel. It is not so much a matter of the material of the packing as the care with which it is fitted in the stuffing box. If the stuff is pressed evenly into the box throughout the operation the gland may be slacked back to hand tight after squeezing the lot home and the rods or plungers will run sweetly and soon get a beautiful polish on them. If there is any leakage it is best to repack the gland at the first opportunity, and I always forbade any undue heaving up as it simply tended to score the rod and in the case of a spray valve to prevent closing which would result in smoke and waste of fuel. In my opinion much trouble would be saved with rods of all description, especially in the water ends of bilge pumps, if a similar routine was followed.

High Fuel Pressure

The fuel pressure of 4,000 pounds to the square inch might cause misgivings to engineers unused to such pressures, but such are quite unfounded and there is no difficulty at all with the joints which are designed for the pressure, or with the glands. I found no more trouble with the solid injection pump or the fuel service than I had with the corresponding fittings in air injection engines I have served with afloat. Perhaps I have been unfortunate in my experience with the latter type of engine, but I must confess I came to regard high pressure air in connection with the fuel in a Diesel engine as a dangerous shipmate. Diesel experts would doubtless have something to say in the matter, but a plain sea-going engineer like myself will probably be excused by most members of this Institute for feeling a bit uneasy in the neighborhood of an engine that had on occasions in my presence burst cylinder covers through some vagary of the injection apparatus. With the pump injection, on the other hand, everything seems such plain sailing and one has confidence that smoke is probably the most serious result of any failure to treat the system in the proper manner.

I believe that the modern air compressors are much better than those in use some years ago, but even so I reckon that they form the weak spot in the ordinary Diesel engine. Apart from valve trouble the pipes are apt to be scoured and oxidised by the hot compressed air, and I see that Duplicate Compressors are fitted in a number of engines. Explosions in the intercoolers due to the wrong sort of lubricating oil, or as far as that goes, whatever oil is used, seem to take place every now and then in land stations, so I am inclinded to think that in ships where conditions are not

so favorable, air injection should be regarded as a half-way house to something better.

Speaking of intercooler explosions, I remember that while engines were being built I was talking over Compressor troubles with the makers, and was at first surprised at the statement that as the result of one of these explosions a steel plate separator, though proved to be of perfect quality, had shattered as if made of some very brittle material and that a needle of steel had been shot into the breast of one of their engineers with fatal results. The cause of this must evidently have been something in the nature of an explosion wave or else a detonation as opposed to the less sudden pressure rise described as an explosion, and owing to oil being very finely broken up, mechanically or perhaps even chemically, and in close association with the oxygen in the highly compressed air. I have thought that the heavy knocking sometimes experienced in air injection engines, when the blast air was excessive, might be due to something similar and that the bursting of covers and the fracture of crankshafts, sometimes happening in engines with the air system, might be due to the same sort of thing in a less violent form. However that may be, nothing of the kind as far as my experience goes can happen with a solid injection engine. High pressures can be obtained if the spray valves leak or if injection is set too early, but these are matters which require no particular knowledge or care to avoid. Even so the pressures seem to be more gently imposed and in the submarine engines which, by the way, have no cylinder relief valves, I have seen a spray valve continuously open for demonstration purposes with no ill effects, the result simply being smoke and heavy knocking or "tonking" in the cylinder. The indicator diagram is, of course, very peaky in such circumstances, and I would prefer not to carry out "stunts" of this sort on the larger engines in my own ship, but I feel sure that the results of abnormal conditions with solid injection are more gentle than with air injection, however, the indicator may fail to distinguish between the two. It was certainly remarkable how easily the Trefoil's engines picked up even at low speed with a practical absence of shock, the whole performance reminding one of our old friend the steam engine, though the oil engine could pick up full power or a bit over in a fraction of the time taken by the steam engine.

The Commercial Side

During the discussion on Mr. Peel's paper I saw that the solid injection set was stated not likely to be a commercial success, except in the smaller sizes, owing to an absence of turbulence. I don't profess to know what happens inside the Trefoil's cylinder, and as a sea-going engineer I am more concerned with fuel consumption per mile run or per shaft horse power. The Vickers' engineers claim that the solid injection system will give at least as good consumption as air injection in similar circumstances, and judging from the Trefoil's running which took place on any service fuel that we happened to be carrying for the fleet, I see no reason to doubt their claim. As regards consumption, the unwary shipowner and engineer are sometimes misled by figures being given per indicated horse-power, or sometimes simply per horse power. With steam engines or core or less standard efficiencies this is a good enough basis of comparison, but it would be better to bring all consumptions to a brake or shaft horse power basis, as is done for turbines. This eliminates the frequent error in indicator diagrams, which, as ordinarily taken, are none too reliable on oil engines where temperatures are high, and the figures would then have a practical meaning. The indicated power consumption gives the air injection an unfair advantage, as with equal effective consumptions the more inefficient the engine is mechanically, the better the consumption appears for comparison.

In commercial work the mean pressures are moderate, so even if air injection permits of higher duties these will not be required for mercantile marine work. There is in the cylinder at ordinary ratings about twice the amount of air theoretically required for combustion, so, as we have often found in the Trefoil, there is room for a fair overload without needing any extra air from blast compressor. If the engine is in good condition the exhaust remains practically clear even under overload.

Smoke in a Diesel engine seems always to be one of the first things to be criticised in my experience, but I notice that a good cloud is regarded as rather impressive on a steam trial of a coal fire ship, while when burning oil under boilers it is preferred for reasons of economy to maintain a slight color at the funnel. Semi-Diesels give considerable smoke on service in many circumstances without doing any harm, and it has occurred to me that it would be wise to regard smoke in a Diesel rather as a matter for investigation than for immediate censure. I say this because I have found that while with solid injection any fault is soon evidenced by smoke, yet the exhaust pipes remained practically clean. On the other hand, with air injection engines the exhaust might be very good, yet considerable deposit be found in the pipes and on the valves. I can imagine various possible explanations for this, but as I have no means of testing the truth of my idea I simply put it forward as a fact which may be of interest, and one which I think has not been previously mentioned.

The lubrication of the Trefoil's engines was forced throughout. These low headroom engines had no division plate between the crankcase and the cylinders such as a purely commercial engine would have so that the lubricating oil was contaminated by any dirty or burnt oil falling from the pistons, and in a trunk engine. In addition, the bed-plate and drain arrangements led to bilge water occasionally getting into the oil. Even so there was never any thought of bearing trouble, and I am convinced that if only steam marine engines were fitted with forced lubrication to the principal parts the wear and tear and nal expense would be immensely reduced. It is a common enough practice nowadays with auxiliary engines, and I am told that in some of the last reciprocating-engined battleships in the British Navy it was fitted to the main engines with most satisfactory results. It is, of course, necessary to prevent salt water mixing with the bearing oil, but this presents no difficulty in a job designed for forced lubrication. When likely to remain in harbour for any length of time I made it a practice in the Trefoil to use the hand lubricating pump to pump some fresh oil through the bearings after stopping. This washed out any water which if allowed to remain would pit the journals.

Cleaning Water Space

A point that is sometimes overlooked with oil engines is the necessity of periodically cleaning out the water space What is a matter of routine in the case of boiler or of a condensor is apt to be regarded as an irksome task in an oil engine. It stands to reason that just as furnace crowns will come down if boilers are allowed to get dirty, so covers may crack or pistons seize if the water spaces of an oil engine are allowed to fill with mud. Nothing should be allowed to stand in the way of a periodical swilling out of these spaces. The oil engine has come to stay and the routine must be made to suit its requirements.

In drawing my remarks to a close it may be interesting to those unacquainted with oil engines to give some comments upon the oil engine from the personal point of view. Among the number of untrained men who have passed through the Engine Room of the Trefoil I found the majority on arrival not in favour of the oil engine. They did not seem confident in the machinery nor in themselves, feeling that they lacked intuition to go to the source of any trouble if it arose. After a while they learnt that a good oil engine does not require a professor to run it and that it may be run with less trouble than a steam job. They then became enthusiasts for the oil engine as a self-running apparatus, and it was necessary to keep them alive to the fact that there remained work for them in the way of inspection even if repair was not needed. Their general expression of opinion after settling down was that the oil-engined ship was far preferable to the steamer and I am convinced that from the Trefoil there has gone out a number of men intent on spreading far and wide the advantages of the solid injection oil engine. You will have gathered my own opinion from the notes I have given, and I can honestly say that my log shows much more work was occupied in

keeping steam auxiliaries in order than was devoted to the main engines, experimental and special in design though they were. In my judgment, given a little instruction in the construction and working of the machinery there is nothing to prevent any average steam engineer with some power of adaptability from becoming in a short time fully competent to run an oil engine of large power, and no fear that any highly scientific knowledge is required need be entertained.

If engines can be made to hold these opinions, the fuel consumption, which is well below half that of oil fired steam ships, should convince owners that it is worth while to consider oil engines for ships for which engines of the power required are being offered, and I am of the opinion that before long we shall see few ocean going cargo ships built with steam engines, and then when the freight costs fall, the economy of the oil engine will give to the owner of the oil-engined ship an unassailable advantae over his less enterprising competitor.

As experience is increased it will doubtless be found that there is room for a variety of makes of engine. Judging from the result of development of the steam engine which in its early days took many peculiar shapes, advantages on paper, but eliminated as the result of sea experience, I am inclined to think that even allowing for the difference in the driving power, evolution will for ordinary commercial purposes result in oil engines being arranged as regards their principal parts, very much on the lines of the latest reciprocating steam engine. When I find myself being persuaded of the virtues of some very novel arrangement of an oil engine, I often realize that the same arguments would apply to a steam engine on the same lines and I become doubtful if the unorthodox type will receive more than a passing favour for ordinary cargo ship use.

As regards the choice between the four and two-stroke cycles for medium powers and speeds there seems little to choose on the grounds of weight and space or cost if the same rating is followed in each case. This being so I favour the four-stroke engine as being practically just as simple as the two-stroke engine, the absence of the scavenging pumps being a great advantage, and subjected to a less continuous high temperature.

The final method of working auxiliaries will, in my opinion, be electric, unless tank heating or other special circumstances cause steam boilers to be in use, but doubtless many owners will be wise in retaining steam auxiliaries till the oil engine has become more familiar to their engineers, thus introducing one novelty at a time. Electric auxiliaries for the engine, such as circulating and oil pumps, are in my opinion much preferable to the pumps driven by sway beams off the engine, and will ultimately become universal.

Solid injection, whatever may be advanced against it from the theoretical side, is undoubtedly a working proposition, and I expect to see it taken up more by various makers now that it is coming into use in commercial vessels and its wide and successful use, hitherto more or less secret, is becoming known. The Americans among other foreign countries seem very much alive to its possibilities and it would be well, now that Great Britain is seriously taking up marine oil engine manufacture, that her engineers should give it full and unbiased consideration.

HALIFAX SHIPYARDS, LTD.

The Halifax Shipyards, Ltd., have delivered to the Canadian Government Merchant Marine the "Canadian Constructor," the last ship which they had under contract. This yard had no further contracts on hand.

During December the company repaired in the dry dock the "Brant County," which had been damaged on the bottom through stranding in the St. Lawrence near Quebec. So far this year the repair work carried out by the company consists of drydocking the "Canadian Spinner's for painting and scraping, the "Canadian Hunter," for scraping and painting the hull. Besides this the tail end shaft was drawn, the old propeller was removed and replaced with spare propeller. The "Mapledown" was drydocked to repair slight hull damage sustained at the pier at St. John, N. B.

MIDLAND SHIPBUILDING CO., LTD.

The Midland Shipbuilding Co. have enough repair work on hand to keep them going for some time. Some of these jobs are dry docking repairs, while others are all above water or machinery work. The steamers under repair include the "Glenmavis," which is having repairs made to her bottom, the steamers "Glenavon" and "Glenlivet," besides a number of vessels for the Canada Steamship Lines.

CANADIAN VICKERS LTD.

Repairs are being carried out in the above yard at Montreal on six lake vessels, owned and operated by the Geo. Hall Coal Co of Canada Ltd. This is the only work on hand at the moment.

PORT ARTHUR SHIPBUILDING CO. LTD.

The above company have the following report of their business at present date. They have a contract for building a steel bulk lake freighter for the Matthews Steamship Co., of 550 feet length, by 58 feet moulded breadth, and 31 feet depth moulded, having a carrying capacity of 10,000 tons. The engines will be of the triple expansion inverted vertical having cylinders 25½ inches, 41 inches, and 67 inches by 42 inch stroke. Steam will be supplied by three Scotch boilers 13 feet 6 inches diameter by 11 feet 2 inches to work at a pressure of 185 lbs. per sq. inch.

In addition to this the company is building a pair of Scotch steel boilers for the "Huronton" to be completed by the opening of navigation. These boilers are 11 feet in diameter, by 12 feet long, and will work at 180 lbs. per sq. inch.

During the navigation season just closed, the Port Arthur Shipbuilding Co., carried out the following repair work. The steamer "Francis Widlar" was completely reconstructed, and after completion of the repairs renamed th "Bayton." This vessel was in dry dock from Aug. 22nd to Nov. 18th. In addition to this vessel, six others were docked, and seven vessels were repaired which did not require docking.

The company have recently added to their activities the building of pulp mill machinery and low pressure boilers. This enables them to keep their very competent staff supplied with all the year round work, so that they are not scattered when the season resumes.

The company expect to have 600 men employed by June 1st on the building of the steamer, beside the staff employed in the other departments.

TYNE SHIPBUILDERS OUTPUT

Messrs. Swan, Hunter and Wigham Richardson, Ltd., report as follows for the year 1921:

14 merchant ships launched, with total tonnage of 92,315.

Engines built by Swan, Hunter and Wigham Richardson, Ltd., at their Neptune Works, Walker, Newcastle-on-Tyne, 31,475 horsepower.

The following describes the kind of engines built and comprised in the year's output of 31,475 horsepower:

2 single-screw sets of double reduction geared turbines.

1 twin-screw set of double-reduction geared turbines.

2 twin-screw sets of reciprocating engines.

2 single-screw sets of balanced reciprocating engines.

3 single-screw sets of reciprocating engines.

Repairs

The Dry Docks Department during the year undertook a large number of important repairs in addition to docking many ships for painting, surveying and general overhaul. Of the above mentioned tonnage, 92,315, 12 ships with a tonnage of 87,570 were launched from the Tyneside yards of Swan, Hunter & Wigham Richardson, Ltd., and two ships with a tonnage of 4,745 from their Wearside Shipyard.

The Drake Engine Company, of Grand Haven, Mich., have opened a Canadian Sales office at 45 Adelaide Street, Toronto. Capt. Stitt is in charge.

Report of the Joint Commission

Below is a partial summary of the report of the International Joint Waterways Commission, issued from Ottawa, dealing with the work and recommendations of the Committee to date.

"It appears from the report," says the summary, in part, "that the members of the commission, as a result of their long and careful study of the situation from every possible angle, have reached the conclusion that the proposed deep waterway is practicable both from an engineering and an economic standpoint, and that it would result in adding very materially to the prosperity of the two countries. So far as the United States is concerned, they believe that the benefit would be immediate. In the case of Canada, it might take a somewhat longer time to reap the full advantages of such a route.

Board of Engineers Gives Advice

"As to the engineering features of the improvement, the commission has had the benefit of the expert advice and assistance of a Board of Engineers created by the two Governments, Canada being represented by W. A. Bowden, Chief Engineer of the Department of Railways and Canals, and the United States by Col. W. P. Wooten of the Corps of Engineers. This board, as the result of over a year's painstaking study and field work, filed with the commission a comprehensive report as to the best means of improving the river for both navigation and water power development in the international section of the river—that is, from Lake Ontario down to Cornwall—with the principal power works in the vicinity of the Long Sault Rapids, designed to produce about 1,500,000 horsepower, one-half of which would go to each country.

Estimated Cost of Project

In the purely Canadian section of the river, from Cornwall down to Montreal, only a navigation system is provided, the development of power to be undertaken at some future date, when the growing markets in Canada make it desirable. Locks and Canals with a depth of 25 feet are provided for at the Long Sault, Valleyfield and Lachine. The estimated cost of the entire improvement, both for navgation and water power, is about $252,000,000.

Proposed Division of Cost

"Probably the most difficult and delicate problem the commission had to settle was how the cost of this international project could be divided between the two countries so as to put the thing on a fair and equitable basis. The commission's solution, as embodied in its report, is that the cost of that portion of the work chargeable to navigation should be divided on the basis of benefits received; that is to say, that each country should pay a proportion of the cost equivalent to the benefit it actually derives from the waterway.

Obviously, this principle involves readjustment at periodical intervals, as the traffic develops on one side or the other. Provision is made for a tentative distribution during the construction period, based on the production and foreign trade of the territory economically tributary to the waterway on each side of the boundary.

Credit on Welland Canal

Further, in distributing the cost of the waterway, Canada is credited with her expenditures on the Welland Ship Canal, which is considered an essential part of the general scheme of improvement.

"These are, in substance, the recommendations of the International Join Commission, as embodied in its report to the Governments of Canada and the United States. It now rests with these governments to accept or reject the recommendations, as they may see fit."

TRIALS OF P.L.M.24

On Friday the 23rd December, 1921, the large steel screw steamer "P.L.M. 24", which Sir Raylton Dixon & Co. Ltd., have built at their Cleveland Dockyard, Middlesbrough, for La Compagnie des Chemins de Fer de Paris a Lyon et a la Mediterranee, whose shipping business is managed by their subsidiary Company, La Societe Nationale d'Affretements, proceeded to sea for her official trials.

The steamer is a single deck vessel of the Harroway-Dixon Cantilever Eramed type with top-side water-ballast tanks, her principal dimensions being 400 x 56 x 31 moulded, and she has a deadweight carrying capacity of about 8,900 tons on a light draft of water. She has been built under special survey to receive Lloyd's highest classification also to meet the requirements of French Law.

The vessel and her machinery have been constructed under the superintendence of Monsieur Marechal and Captain Veyrat of La Societe Nationale d'Affretements and Mr. Reginald J. Eyres of Messrs. Eyres & Bryers, Newcastle on Tyne, Sunderland and Marseilles.

The trials were highly satisfactory in every way.

LAUNCH AT MIDDLESBROUGH

On Tuesday, the 15th December, 1921, Sir Raylton Dixon & Co., Limited, launched from their Cleveland Dockyard, Middlesborough, the large steel screw steamer "P. L. M. 26" which they are building for La Compagnie des Chemins de Fer de Paris a Lyon et a la Mediterranee, Paris, whose shipping business is managed by their subsidary company. La Societe Nationale d'Affretements.

The steamer is a single deck vessel of the Harroway-Dixon cantilever framed type with top-side water ballast tanks her principal dimensions being 400 ft x 56 ft. x 31 ft. moulded and she has a deadweight carrying capacity of about 8,900 tons on a light draft of water. She is being built under special survey to receive Lloyd's highest classification also to meet the requirements of the French Law.

The hull and machinery are being constructed under the superintendence of Monsieur Marechal and Captain Veyrat of La Societe Nationale d'Affretements and Mr. Reginald J. Eyres of Messrs. Eyres & Bryers, New-on-Tyne, Sunderland and Marseilles.

A GRUESOME RELIC

One of the oldest ships that has visited Montreal in many a long day and probably the strangest ship ever seen in local waters is expected to visit this port next season to make an extended stay, according to a letter received from her master, Captain D. H. Smith, who commands the famous old Australian convict ship "Success." This ship is now on a tour of the world, and her master hopes to sail her up the St. Lawrence shortly after the opening of navigation in the spring. The stay in this port is scheduled for several weeks, during which time the ship will be open to visitors. The exact date of the visit has not yet been settled as the ship's itinerary for next year is still being planned. The "Success" spent some time in New York harbor last year. She is the only survivor of those ships that once comprised the notorious "felon fleet," which between the years of 1787 and 1868 transported over 167,000 men, women and children from Great Britain to Australia. The ship "Success" was built in 1790 at Moulmein, British East India, to be used as an armed East India merchantman. She was purchased by the British Government in 1802 and was converted into a floating convict prison and soon became the commodore ship of the felon fleet. Although the oldest ship afloat in the world she is unchanged after all these years, nothing being omitted from her except her original human freight. Aboard her are now shown in their original state, all the airless dungeons and the condemned cells, the whipping posts, the manacles, the branding irons, the punishment balls, the leaden-tipped cat-o'-nine-tails, the coffin bath and other inventions of a more unregenerate age. The "Success" was scuttled in Sydney harbor in 1885, but was raised five years later, and has since, it is claimed been inspected by more than 15,000,000 people.

Fire damaged the foundry plant of McLean, Holt Co., St. John, N. B. to the extent of $20,000.

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The Joint Waterways Commission

THE JOINT Waterways Commission after long and exhaustive study of the proposed deep water canal from Lake Erie to the sea has issued a report, which is published elsewhere in this issue. The commission have reached the conclusion that the waterway is both practicable and desirable, though they state that the United States would be the first to feel the benefit of the scheme.

The estimated power that could be developed they estimate at 1,500,000, one half of which would go to each country, while the estimated cost for the whole project will be $250,000,000. In the purely Canadian section of the works, which extends from Cornwall down to Montreal, no power development is provided for at the present, it being considered that there will be no market for power in this district until Canada grows in population. Locks and canals are provided for at Long Sault, Valleyfield and Lachine, with a depth of twenty five feet. It is proposed that the division of cost of the navigation works shall be divided between each country in the proportion of the benefit each country actually receives from the waterway.

This method would seem to be one fraught with possibilities of considerable trouble, in determining what were the benefits received. We presume that all tonnage passing through the waterways with an ultimate port of discharge in Canadian territory would be classed as a benefit to the Canadian people, while all tonnage bound for a U. S. port would be credited to the U. S. The commissioners admit that this question of apportioning costs will be of the most difficult and delicate nature.

If the limit of depth provided is to be twenty-five feet, the prospect of large ocean-going cargo steamers using the canal becomes less and less. A steamer of 5,000 tons to 7,000 tons deadweight draws from 22 to 25 feet water when loaded, and we cannot conceive of a shipowner sending a vessel through a long inland sea passage with locking, etc., to be gone through and only a couple of feet of water beneath the ship's keel.

There is considerable opposition from the people of New York and the Eastern States generally, their idea being that the waterway will injure the ports of the Atlantic coast which have spent many millions of dollars in providing harbor facilities. We think that their fears in this respect may be dismissed. A case in point is that of the Manchester Ship Canal in its relation to the port of Liverpool. Here was a case where a large city, the centre of a very thriving industrial community, chiefly employed in textile working, was situated 40 miles from the port where most of the raw material was delivered from overseas. The people of the inland city conceived the idea of building a canal large enough for the ocean-going ships of that time and for the future. The canal was built at enormous cost, the corporation of the city going deeply into debt in guaranteeing bonds, etc., and the good people looked for the end of Liverpool as a port. Manchester got a certain proportion of trade but never enough to pay the enormous fixed charges on the undertaking, while Liverpool continued to grow and expand its docking facilities just as if the canal had never been built.

This canal is only forty miles long, with three sets of locks. Its early days were marred by accidents of all kinds to the vessels using it. Large ships, that is ships of 1,000 tons and upwards cannot use it to-day. What are the possibilities of a canal system hundreds of miles in length, with numerous locks, a maximum depth of 25 feet, and a shut-down of six months in every year?

* * * *

The Swing of Trade

THE COAL TRADE has furnished some examples recently of how circumstances may be radically altered in a comparatively brief space of time.

It is but a short time ago that the Welsh coal fields were in the throes of a bitter strike, production of coal was practically stopped, and the British export trade in coal was dead. In addition to the strike, British coal had been suffering for a long time from high prices due to abnormally high costs, and had been losing ground in the world's markets for that reason. In the crisis which arose when the strike took place, American coal owners saw an opportunity and made a bold bid for the European markets, and with some degree of success. Not only did America compete, but the British Dominions overseas got into the game, and coal was actually shipped from Australia, India and South Africa to European ports. Of course, this was an exotic growth, and speedily subsided. The American competition became more feeble as Welsh coal prices began to come down, and is at present almost negligible.

Now comes the swing of the pendulum. Instead of American coal competing with British coal in the European markets, which by reason of their proximity by water to the shipping ports of American coal, are the most favorable for such competition, British coal is displacing American coal on the west coast of North America. There have been recent shipments of Welsh coal to San Francisco, the first one being 5,000 tons, and other shipments are following to make up a total of 25 000 tons.

The reason is not hard to find. Firstly, there is no coal in the world equal to the best Welsh bituminous, and it is in universal demand when its price is within reach of the consumers. The rate of exchange would, of course, make the price better to an American customer, while the freight rate from Cardiff through the Panama Canal to the West coast would compare very favorably with the freight charges by rail from the Pennsylvania or Virginian fields.

News of the Shipping World

THE MOTOR SHIP "Dominion Miller," represents an interesting development in the motor ship. She was launched recently, and is to be fitted with a Doxford opposed two ton two cycle engine. She is 9,400 tons deadweight capacity 420 feet long, by 54 feet beam, and 25 feet 6 inches depth. She and her sister ship, built for a Swedish firm, are the largest vessels in which a single screw has been fitted with internal combustion engines.

The compression pressure in the cylinders will only be 300 lbs. per square inch, and this necessitates an uncooled piston head to provide the necessary temperature for ignition. It is intended to use as fuel the ordinary oil fuel such as is burned under boilers, and it will therefore be necessary to fit heating arrangements in the double bottom where the oil is carried in order to make it of higher viscosity before going to the pumps. There will be no air compressor for the fuel injection, solid injection being used, and a pressure of 9,000 lbs. per square inch on the delivery side of the fuel pump. The vessel is owned by Messrs. Furness Withy & Co.

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AN ENGLISH shipping paper, in discussing the high place held by the Admiralty Court of Great Britain in the esteem of shipping men of all nations, an esteem which foreigners show by having their cases tried by the British Admiralty Court judges, raises an old question. It is a peculiarity of the methods of jurisprudence that the Admiralty judges, and the divorce court judges are one and the same. The paper in question asks the old question as to why this should be, the two courts having nothing to do with each other. While at first sight it is difficult to see the connection, cynics say that there is a very good reason for the practice. This is that in both the divorce court and the admiralty court, deliberate lying reaches its highest efficiency, if such it can be called. One has only to read the evidence in the average divorce case, or the average collision case, to become a convert to this view. It is difficult to see how such diametrically opposite stories could be told as usually are told by the antagonists, unless one side or the other is at least stretching the truth.

It is said that it was the admiralty court that gave rise to the description of an expert which runs as follows: "There are three kinds of liars, a liar, a damned liar, and an expert." However we will not say that all experts are liars, any more than that all liars are expert, but it is sometimes very hard to distinguish to which category they belong.

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THE FIGURES for the Welland Canal for the season of 1920 show a very big increase over those of the previous year, the actual figures being an increase of 800,000 tons. The total tonnage passing through the canal was 3,076,966 tons. The vessel carrying the largest upbound cargo was the "Winona," which took up 2,800 tons pulpwood, while the "Beaverton" had the largest down-bound cargo, 2,750 tons of oats. The total number of vessels passing through the canal was 3,750, 1,859 going up and 1,848 down. The increase in tonnage was contributed to by barley, rye, oats, corn, flax, wheat, agricultural implements, iron and steel, coke and ore. The decreases were in cement, brick, lime, petroleum and other oils, pulpwood, soft coal and sand.

WITH THE revival of the Welsh coal export trade, due to the lowering of prices, there has been a marked falling off in the United States coal trade. Welsh coal has come down all the way to 25/6 shillings per ton, which is getting somewhere near pre war levels. In considering this, some of the authorities in the old country seem to be of the opinion that there is nothing more to be feared from American competition, especially as the figures for last year show such a falling off from those of 1920 as far as the U. S. is concerned. Others, however, do not take such a comforting view of the situation. They say that while it is true that British coal owners, by dint of their superior sales organization, and by forcing prices down have been able to recapture markets from which they were temporarily ousted, they have not yet succeeded in killing all competition. According to these observers, the Americans, having had a chance at European markets, are anxious to get there again. With this end in view they are straining every nerve to have freight rates equalized both by rail and sea. At the same time they are watching hopefully for another outbreak of the strike fever among the British miners, which would give them the opportunity to again get in the game.

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THE BIDS for the reconditioning of the steamer "Leviathan," which has been lying in New York harbor for many moons, were opened on the last day of the year, and the assembled companies of shipbuilders and shipowners were astonished at the moderation of the tenders put in. The Newport News Shipbuilding and Dry Dock Company put in the lowest bid for the repairs to the hull, their figure being $595,000 for the interior work on the vessel, and $515,000 for the machinery repairs. Mr. Powell, of the Shipping Board, who was present, expressed his satisfaction at the low tenders offered, and gave it as his opinion that only lack of funds would prevent the Government awarding the contract to the successful firm. If this takes place then the big British ships will have a real competitor for the North Atlantic passenger trade in this former crack German vessel.

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THE "Syren and Shipping" in a recent issue discussed the question of ships which were hoodooed. This is a fascinating subject, and everyone who has any acquaintance among ships can give instances to prove that when a ship is unlucky there is nothing more to be done until she finally goes the way of all ships. Following is our contemporary's account:

A correspondent has written to us on the subject of hoodoo ships. Perhaps he has been reading ghost stories, or, maybe, it is merely a sort of Christmassy feeling that has come over him, but he wants to know who puts the "hoodoo" on steamers and sailing-ships, and how does a vessel get rid of it, and so on. We hardly claim to be authorities on the subject ourselves, but as it is holiday-time and there is not much business to discuss, perhaps there is no harm in telling a story or two, and probably some of our readers will be able to give chapter and verse of hoodoo cases that have come within their own experience. In the first place, it may be remarked that "they" put the "hoodoo" on a ship—"they" being those mysterious people who are included in the expression "they say." As regards the question as to how a vessel rids itself of the "hoodoo," the answer is that in

ninety-nine cases out of a hundred it does not, but the "hoodoo" is alleged not infrequently to get rid of the vessel. Who does not remember the Atlantic liner *City of Rome*, one of the most graceful and beautiful steamers that ever crossed the Western Ocean? On the day of her launch, in 1881, a temporary winch boiler on deck burst, killing three men. "They" said that was a bad start and the ship would have no luck. As a matter of fact, her trials proved that she could not reach her contract speed nor come within 1,500 tons of the cargo she was designed to carry without greatly increasing her draught. She was therefore returned on the builders' hands, and subsequently ran under the Anchor flag. The "hoodoo" was on her, though, and was never quite shaken off, for she was always having minor accidents. Another launching mishap that might be mentioned was that of H.M.S. *Albion*, in 1898. The ceremony, which took place at Blackwall, on the Thames, was performed by her present Gracious Majesty, then Duchess of York. One of the most prominent officials of the yard was a staunch teetotaler, so the "bubbly" was extracted from the champagne bottle and plain water substituted. Unfortunately, however, when the Duchess named the ship and flung the bottle at the bows, the bottle bounded back unbroken. Twice this happened, and a bystander was appealed to. Hurriedly he tore the ribbon wrappings from the bottle and hurled it at the receding bows as the vessel was sliding down the ways. There was a sigh of relief, followed shortly afterwards by a gasp of horror when it was learnt that a big staging had been carried away by the backwash in the launching, and that 40 people had been drowned. All vessels which have an accident at launching are supposed to incur the taint of "hoodoo," but what happened to this battleship in her subsequent career we do not at the moment recall. Changing the name has often been tried in the hope of changing the luck of a ship, for sailors are very superstitious people and are loath to sail in a vessel that has the reputation of being a "hoodoo." Take the *Daphne*, for example, which turned turtle and drowned 120 people when being launched on the Clyde, in 1883. She was easily raised but could not get a crew. Her name was changed to *Rose*, and she went down in Londonderry Harbor. Once more wrecked, and another change of name, and nationality, and she developed a penchant for charging the various islands in the Greek Archipelago. Altogether, she was an incorrigible vixen. Last year there came before the House of Lords the case of the steamer *Eastlands*, a typical "hoodoo" ship. On three separate occasions in September and October, 1917, this vessel suffered damage through collision, fire and grounding, and finally, in January, 1918, she was torpedoed by a German submarine and sunk. Even then there was more trouble for her owners, for they failed to recover her full value from the Government, who had taken over the war risk. Her unrepaired damages caused by the previous accidents amounted to £1,770, and this sum the Admiralty deducted from the agreed sound value in settling the total loss. Nor were they able to recover the sum from their marine underwriters, for reasons which the House of Lords set forth with great cogency, no doubt, but which gave little satisfaction to the owners, who were thus nearly £2,000 the poorer. Lastly, that must have been a real "hoodoo" ship—her name has escaped us—that sailed out from the Bristol Channel and put back there some months afterwards with her original cargo on board. She started out with a cargo of coals for the West Coast of South America, and nothing seemed to go right on the voyage. On approaching the neighborhood of Cape Horn a succession of gales was met, and the captain said to the mate one day that he had had a warning in a dream that they would never round the Cape. The crew bluntly declared the ship was a hoodoo and were verging on mutiny. They demanded to be landed in Argentina, but the skipper decided to put back to Cardiff! The consternation of his owners may be imagined when he arrived back with his tale of "visions about." Of course, the skipper was promptly sacked, as he expected, and a fresh crew engaged—with difficulty—because the strange story quickly got about the docks. Eventually, however, she sailed away on her second attempt—and there is no more to add because no more is known. Neither ship nor crew was ever heard of again."

AN OCEAN EMPRESS

When the "Empress of Japan" sailed from Vancouver for Yokohama, Kobe, Nagasaki, Shanghai, and Hong Kong a short time ago, says a western exchange, she started on her one hundred and fifty-fifth voyage. A voyage in steamship parlance is a round trip, or, in other words, until the ship returns to her home port again. The distance from Vancouver to Hong Kong is 7,291 miles, or a total of 14,582 miles to be covered on each voyage. When the "Empress of Japan" arrived at the port of Vancouver, she established a record for Trans-Pacific voyages. With the competition of her one hundred and fifty-fourth voyage, "the Empress of Japan" had covered 2,500,000 miles in the Canadian Pacific service, or equal to nearly one hundred times around the globe. In computing this record, there is not taken into her account her four years' service.

The "Empress of Japan" was built at the yards of the Naval Construction and Armaments Company at Barrow-in-Furness, and arrived at Vancouver in 1891. She is a steel twin-screw steamship, three masts, two funnels, of 6,000 tons, is 445.6 fet. in length, 51.2 ft. in breadth, and 33.1 ft. in depth, 100 A-1 according to Lloyd's Register, and is noted for her trim yacht-like appearance. She has enjoyed greater popularity during her entire career than almost any of the smaller class of steamships either on the Atlantic or Pacific.

For thirty years the "Empress of Japan" has been in constant service without a single mishap to mar her record. Although in her day she was considered the finest of her type afloat, and for two decades was "Queen of the Pacific," she relinquished that honor only when the speedier "Empress of Russia" and "Empress of Asia" were added to the Canadian Pacific fleet between Vancouver and the Orient.

It is a tribute to the builders that the ship's original boilers are still in her hull and doing good service. In fact, the "Empress of Japan" still maintains a speed of 16½ knots an hour, and on October 8 she made 387 miles in the twenty-four hours' period The "Empress of Japan" accomplished the last trip from Yokohama to Vancouver in a little less than 12 days, allowing for the Meridian day. Some of the crack American liners which have recently entered the Pacific service are considered to have excelled themselves when they cover the distance in from 14 to 15 days.

C. P. R. COMMANDS

There was recently announced the appointment of Captain Samue Robinson, R.N.R., as commander of the new Canadian Pacific liner "Empress of Australia." Capt. Robinson, formerly commanded the "Empress of Russia" and last summer he left her and went on furlough. Capt. W. Dixon-Hopcraft, R. D., R. N. R. succeeded Capt. Robinson in command of the "Empress of Russia." Capt. Robinson has had an extended career with the Canadian Pacific Steamships Ltd., which began in 1895, when he was captain of the old "Empress of "Japan." Since then he has been on the "Empress of China," "Ruthenia," "Athenian," "Monteagle," and the "Empress of India." Throughout the war Capt. Robinson commanded the "Empress of Russia."

The "Empress of Australia" was the former German liner "Tirpitz" and she was recently purchased by the Canadian Pacific Steamships, Ltd., and after being purchased was christened the "Empress of China." She has now been rechristened the "Empress of Australia."

Molding a Propeller Screw Wheel in Loam

Primitive Method Has Some Advantages Over Modern Molding—No Pattern Is Used but Pattern-maker's Skill Is Required

By F. H. BELL

The subject of loam molding is one which interests every molder, but is, at the same time, understood by few. It is undoubtedly the oldest branch of the molder's art, but this, of course, does not add to its value. It has been outclassed in many ways by more modern methods of molding for the general run of work. But loam molding has its advantages in some cases and could be used to exceptional advantage in the most modern foundries, if more of the modern molders understood it, but even the material from which loam is made is to a great extent misunderstood by many foundrymen who are good loam molders. In practice, loam has always been a brand of molding sand exceptionally rich in clay, and applied in an exceptionally wet condition. If a sand of the proper clay proportion is not available, clay is added, and when a properly proportioned mixture is thoroughly dried onto a good substantial brick backing it will stand the heat and pressure of the heaviest casting, while also being a convenient material from which to make the mold. The one draw-back would be that the metal would not lie on it as there would be no escape for the gases which would be generated. To overcome this an opener of some kind was mixed through to give it vent. This opener might be saw-dust or straw, but quite frequently horse manure, any of which would burn out in the drying and leave the mold as substantial and refractory as before while being porous like a very fine sponge. This is still the practice on some classes of work but is not of any great importance on others, as an ordinary core sand mixture works all right in some plain work, while molding sand mixed with black core binder will work on quite complicated jobs. Millville gravel, a natural product, is a good mixture for the heaviest class of work. Whatever composition is used, the molder should use judgment and see that no part of the mold is allowed to be passed over without care being taken to see that the gas is going to escape and if a pocket cannot be vented by other means a special mixture with an opener in it is preferable to a defective casting.

One feature which was formerly of big consideration, is now less essential, viz., the fact that a very large job could be done without a large crane or oven, as the mold could be built and dried right in its place and if necessary poured direct from the cupola. With the advent of the powerful electric crane, almost any piece can be made in a sand mold, and dried in the oven which usually accompanies such a crane. There are, however, cases where loam molds of large proportions can be made and lifted into the oven, to better advantage than by attempting a sand mold.

Mold a Propeller in Loam

In last month's paper we showed how propellers were made from a single-blade pattern in a dry sand mold, which method is most successful, but not always possible or advisable. In a properly equipped loam-molding foundry good headway can be made in loam molds and first-class work result. In Great Britain this is still the practice in the best foundries and a description of how it is done will be of interest.

In our last article we pointed out that the pattern-maker was of prime importance. In the loam-molding process he is of even more importance, although no pattern is used, but the pattern-maker is the man who must provide the strickles and other necessary rigging which looks simple to the molder when handed to him but which represent a lot of calculating on the part of the pattern-maker. Even in the loam process there are different ways of proceeding —some more efficient than others.

Presuming that we have no equipment and only intend to do a moderate amount of business the method adopted by Simpson Bollard is about as complete as any and will require the minimum of expense in making preparations. Mr. Bollard in his illustrations shows a three-bladed propeller, although four blades make the recognized standard wheel, but as far as the molding goes one is as good as the other.

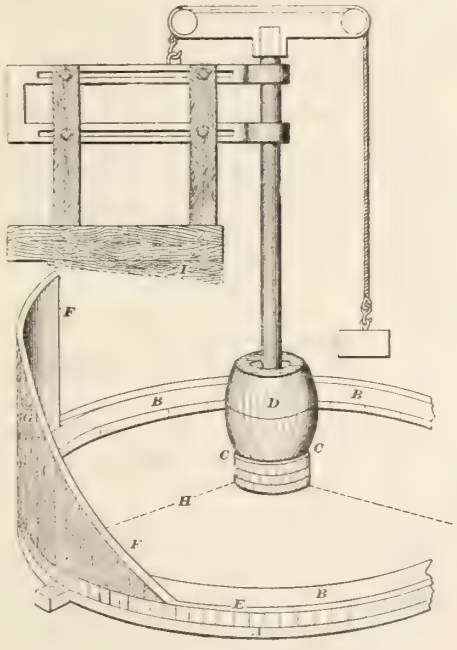

Fig. 1

Let the foundation-plate A, Fig. 1, be 12 feet in diameter, resting on firm ground, and begin by striking the bearings B and C, Fig. 1.

The sweep for striking these bearings will bring the bottom of the hub high enough to allow the blades to be built. As the hub in this case is about twenty-four inches in diameter, a wooden pattern would be an expensive affair, and to overcome it there are two ways open to the molder to form the hub. One is to work a sweep against the spindle as the blades are being built; the other is to build a dummy pattern on bearing C, as shown at D, Fig. 1, before commencing to build the blades. We will adopt the latter. Now let a line be drawn all round the outside, as seen at E and divided according to the number of blades, which in this case is three. The inclined frame F is now set to the line E, with centerline at line H on bearing B.

In order that the beginner will better understand what he is working at we will refer to Fig. 2, which is a perfect view of the blades as they will appear when built, and he will be in better shape to understand the various instructions he is called upon to follow. The inclined frame F, which is the guide for the sweep, and which might appear to be one of the difficult propositions for the pattern-maker to lay out is in reality very simple. It would be laid out flat to begin with, and a straight line drawn diagonally across it at whatever angle is required for the proper pitch of the blade. It is afterwards sprung into the proper curve to fit the portion of circle as shown. A triangular piece of boiler plate is frequently used, being run through the rolls until it fits the circle. As the sweep must travel up and down the inclined guide F to give the required pitch to the blade, the arms must work free on the spindle, rising and falling as needed. To accomplish this, a method is shown at Fig. 1 which is simply a cross-beam, with socket to fit the top of the spindle, and with a pulley at each end, over which a rope travels with a counter-weight at the back to balance the sweep board. The sweep is plain, and must be set in line with center of spindle.

The first process is to brick high enough for thickness of blade, and to do this a guide piece I is screwed to the bottom of the sweep, this being the true section of blade from hub to outside. The reader will understand from this that the flat or true face of the propeller, which is, in fact, the working face is to be cast uppermost in the mold. This may not always be advisable, but will be described first, as it is sometimes the most advantageous way, according to the design of the wheel. When all the piers are built to this shape, remove the piece I, but leave the sweep in its exact position in regard to height and build up the brick work beyond the diameter of the proposed blades until it reaches the sweep board, and filling in the space formed

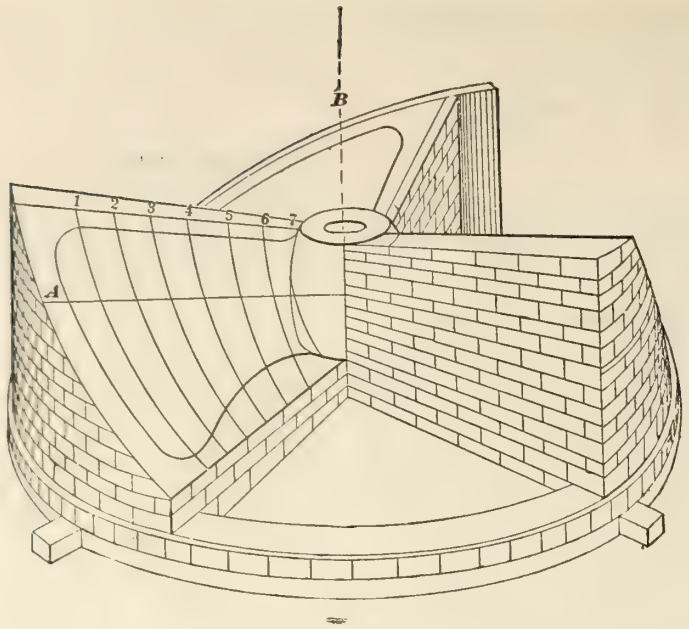

Fig. 2

by the piece I with loam or any substance which will hold its shape and form the face of the blade when swept with the straight sweep board. This will not, in reality, be the face on which the cope will be built, but it will form the face on which the blades will be laid out. As soon as all the blades are swept true to the inclined frame and allowed to set enough to hold their shape the sweep is brought down to the line G on the inclined frame and a line marked across from G to the hub. This line in the center of the blade. Fig. 2 is a perspective view of the mold at this stage, with the three blades built and this center line drawn, the lines being shown at A and B. The lines 1, 2, 3, 4, 5, 6, 7, Fig. 2, are scribed down with the sweep, and are an equal division of section of blade, as shown at Fig. 3. From the center-line A, Fig. 2 is marked off on either side the width of the blade. A paper pattern of proper shape for blade is as good as any to get the outline of the blade. The filling material is now removed to the shape of the outline, and the marks 1, 2, 3, etc., which project beyond the outline, will show where the sections Fig. 3 are to be placed. These sections will rest on the original surface swept by the piece I, which surface and the outline would have made the blade complete, were the blade to be the same thickness right across. This not being the case, these forms, which are the proper depth at the deepest part to bring the top in line with the swept joint or upper surface are put in position and secured; loam is tucked under them forming a portion of the blade of proper shape. These portions after becoming set and the forms removed make guides from which to sweep with a short piece, the proper shape of blade. Green sand is now rammed in good and hard, and struck off smooth with the sweep. This may be dried or it can be used as it is, with care.

The bottom half of the mold is now complete, and it only remains to have copes over the blades and a top for the hub. There are different ways of making the copes, but as we are following the least expensive method of getting equipped, a frame with slats to hold the bricks together is what would most likely be adopted, but if business possibilities warrant, grids made to fit the twist represent a more advanced idea.

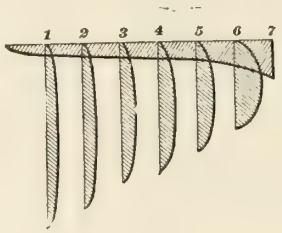

Fig. 3

Complete copes would be all right, in which case, dry sand copes could be put onto the loam bottom. The different methods of making copes together with a more complete article on making the bottom part and also the pattern-maker's share in making the mold without pattern will be described in a future article.

THE "AURORA" OIL FUEL BURNERS FOR FOUNDRIES

Mr. A. H. Wilkie, of 78 Duke Street, Liverpool, England has developed a useful fuel burner of the portable type that is especially designed to be of use in foundry work.

Two types are made, one operating by means of compressed air and the other by means of a hand air pump. The compressed air type has the advantage of instantaneous starting. There is no preheating necessary, and as there is no coil there is never any choking up through carbonization. Any kind of oil fuel can be used.

The burner proves to be particularly economical when used to dry floor moulds. Economy in both fuel and time is realized. The use of the burner to dry steel moulds shows remarkable results. The fuel saving is from 25 per cent. to 50 per cent. and in two hours a mould can be dried that will require twenty-four hours with a coke fire.

For lighting up a cupola it is also used to advantage. A 5 inch steel pipe is placed in the bottom of the cupola and the coke placed on the hearth. The pipe is withdrawn, preferably through the rear opening if one is provided on the cupola. Thus an arch of coke is formed and the burner flame introduced here. The result is the first iron down is clean and hot. There are no ashes in the bottom of the cupola, and no fear of a back draught.

The burner is used to preheat castings for burning or welding, drying ladles and heating steel ladles prior to taking the metal from the convertor or electric furnace. This method of preheating ladles is clean and can be continued up till the moment the ladle is required, thus avoiding the possibility of chilling.

Interesting Books:

"Industrial Mathematics Practically Applied," is the title of a book by Paul V. Farnsworth, published by the D. Van Nostrand Co., 8 Warren St., New York. It contains over 1,000 problems and answers, and has 250 illustrations which are very well arranged. This work is claimed to be the result of 12 years' experience by the author as supervisor of apprentices, designing, shop foreman, and instructor in evening classes in technical schools. Every attempt has been made to simplify and analyze, step by step, the various problems, and the author has succeeded in making the examples both practical and instructive.

He starts with signs, symbols, etc., goes through addition, substraction, division, cancellation, and so on, working up gradually into ratio and proportion, going from here into square root, mensuration, geometry, cost calculations, gearing definitions, lathe change gears, rope drives, shaft design, strength of materials, and many other subjects of interest to the student, and ambitious mechanic.

To go into all the subjects discussed in the 274 pages is impossible in this space but any reader desirous of brushing up or learning afresh, the many subjects covered, will find this book interesting and thorough. The publishers price is $2.50.

London:—A contract has been let by the British Admiralty to an English firm to build ten oil tanks, each with a storage capacity of 12,000 tons, at Rangoon, Burma. The successful firm is the Motherwell Bridge Building Co., Limited.

MARINE NEWS FROM EVERY SOURCE

Montreal:—More than fifty million bushels increase in grain from the Great lakes reached Montreal via the Lachine canal, in 1921 over that in 1920, according to the records of the season's operations issued recently by the Lachine canal authorities. The records, as might be expected, show a remarkable increase in all varieties, the chief of which is made by corn, of which there were 25,404,449 bushels. The bulk of this corn was an American grain. In the season of 1920 only 85,816 bushels of American corn passed through the canal. The shipments of this commodity were consistently large throughout the season, the peak being reached in July when 7,313,524 bushels came down the canal. Wheat, also recieved in large quantities almost from the opening of the season, was heaviest in August and September, the months in which the largest number of grain ships were here from the sea, and totalled for the year 27,684,756 bushels against a total of 11,648,250 bushels in 1920. Shipments of oats via the canal in 1921 totalled 8,113,671 bushels. It is remarkable to note that 3,305,866 bushels of this commodity arrived in May. In 1920 only 1,059,014 bushels of oats passed down the canal during the entire season. Barley shipments amounted to 2,158,783 bushels in 1921 compared with 1,984,194 in 1920.

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New York:—The possibility of revival of the Atlantic Transport Line's passenger service between New York and London will please the patrons and representatives of that old established line. It is probable that such a revival will not take place in 1922 with a class of ships such as the Company formerly operated. However, within two years there is a distinct promise of its coming forward with a passenger line. At the present time there is under construction at Belfast a passenger ship for the Atlantic Transport line. It is a well known fact to the travelling public that the Atlantic Transport Line lost its four well-known "Minne" class ships by torpedoes during the war, the "Minnehaha," "Minnetonka," "Minneapolis" and the "Minnewaska." However, the Company still operates a large number of ships in the North Atlantic and have one of the strongest freight fleets in this section. On this nucleus it will be easy for the line to resume operations with combination passenger and freight ships of the "Minne" type. These old vessels were sturdy ships of about 13,000 tons register, and were popular with travellers.

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Montreal.—The "Empress of Australia" which was purchased from the Reparation Commission by the Canadian Pacific Steamships, Limited, is the name of the old German liner "Tirpitz." This new liner will be placed in commission early in the spring in the Canadian Pacific service between Vancouver, Victoria and ports in the Orient. The "Empress of Australia" is practically a new ship having been in the builders' hands at the outbreak of the war. She is now in Hamburg being converted by her builders into an oil burner, after which she will be similar in equipment and standard to the "Empress of Britain." The liner is a twin screw steamship of 19,300 gross tons. 588 feet in length, 75 feet breadth. She has a depth of 41 feet This liner will prove a notable addition to the Canadian Pacific Company's Pacific fleet which already maintains the quickest time across the Pacific with the world-famous, 16,850 ton liners, "Empress of Russia" and "Empress of Asia."

The new liner is expected to maintain a speed of 22 knots and will be able to accommodate 410 first-class, 130 second-class and 330 third-class as well as 1000 Asiatic steerage passengers.

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Canso.—A report from Canso, N. S., dated January 4th, gives a very graphic account of the wreck of the schooner "Alexandra" and the heroic rescue of the crew by the captain, Mathew Munro. The schooner lost her sails and was heavily covered with ice. She became unmanageable on her trip from Ingonish, N. S., to Gloucester, Mass., with a cargo of fish and was driven ashore at Black Point, ten miles from Canso in a blizzard which was raging over Eastern Nova Scotia. The weather was so thick that the first intimation the crew had that they were being driven ashore, was when they made out to the leeward, ragged masses of basaltic cliff. They realized that the position of the vessel was hopeless and they attempted to launch the one small boat which the schooner carried. The ice-bloated lashings were hardly cleared away when a heavy comber, breaking over the schooner smashed the little boat to fragments. The schooner pounded heavily and was soon showing signs of breaking up. The crew clung to the bulwarks with the seas sweeping over them continually while the snow shut out all hope of rescue from the shore. The captain, Matthew Munro, resolved to take a desperate chance. He tied a line about his waist and jumped into the icy water amid a mass of broken spars and other wreckage. The captain fought his way through the surf to the shore. For several minutes he swam along the face of the rocks rising sheer from the sea, in danger of being dashed to death, until at length in a rift of the snow storm he sighted a low-lying ledge upon which, after a hard struggle, he managed to land. Luckily the blizzard eased for a spell and the captain recovering his wind was able to drag the crew of five men through the surf to the shore. Having done this, the captain collapsed.

The crew, soaked and shivering and with nerves badly shaken, set out to look for shelter, and after struggling through the heavy snowdrifts with two assisting the master, they saw a light and were soon able to get shelter in a fisherman's cottage.

As soon as Captain Munro had recovered from his experience he started for Canso, where he has a wife and eight children

The Alexandra was a craft of 93 tons and was owned by G. A. Cruickshank, of North Sydney, N. S., The following day only a few bits of wreckage on the edge of the cliffs were seen.

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Clydebank:—The third of the new Canadian Pacific "M" steamships, the "Montclare," was launched on Saturday, Dec. 18 at the yards of John Brown & Co., at Clydebank, Scotland. The "Montclare," was built to the requirements of the highest class of Lloyd's Register under special survey, and is classed "100-A1." She is a geared-turbine steel steamship with two funnels. The dimensions are 566 ft. in length, 70 ft. in breadth and 51 ft. depth; over 16,000 tons, with regular speed of 17 knots. The "Montclare" and her sister ships the "Montcalm" and the "Montrose" will be in service in the 1922 season between Montreal and Liverpool. They are of the one-cabin type made popular by the present "M's", the "Minnedosa," "Meli-

ta," and "Metagama." Accommodation is provided for not less than 620 cabin passengers, and 1,550 third class passengers. The three new liners will use oil as fuel and will be similar in equipment to the "Empress of Britain" and "Empress of Canada."

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Montreal:—The addition of the "Monclare," "Montcalm" and "Montrose" to the Canadian Pacific Steamships Ltd., will add nearly 50,000 tons to the already remarkable tonnage of the Canadian Pacific Atlantic fleet which now consists of the "Empress of France," 18,500 tons, "Empress of Britain," 15,850 tons, "Empress of Scotland" 25,000, "Minnedosa" 14,000 tons, "Melita" 14,000 tons, "Metagama" 12,600 tons, "Victorian" 11,000 tons, "Tunisian" 10,600 tons, "Pretorian" 7,000 tons, "Scandinavian" 12,100 tons, "Corsican," 11,500, "Sicilian" 7,350 and the "Montreal" 9,500 tons. There is in addition a fleet of cargo steamers which maintains regular services between the various ports of Europe and Canada. The quickest time across the Pacific is held by the Canadian Pacific steamships. These are the "Empress of Russia" 16,850, "Empress of Asia" 16,850, "Empress of Japan" 6,000 tons and the "Monteagle" 6,150 tons. These steamers will soon be augumented by the "Empress of Canada" 22,000 tons, which is now practically ready for the service, the "Empress of Australia" 19,300 tons and the "Empress of India" 17,600 tons. In additon to the regular passenger service between Vancouver and Yokohoma, Kobe, Nagasaki, Moji, Shaghai, Manilla, and Hong Kong, there is a supplementary cargo servce to the Far Eastern ports, including Singapore.

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Halifax:—A report from Halifax states that the schooner "Donald J. Cook," 99 tons register, of Lunenburg, Nova Scotia, was abandoned burning, in latitude 32,59, longitude 58, and that her completement of nine persons, including Mrs. Oxner, wife of Captain Percy Oxner and Mrs. Ben Peeler, wife of the vessel's cook, are on the steamer San Eduardo, bound for Pueroto, Mexico. The information was contained in a message received at Lunenburg about the 20th of December from the steamer Eduardo.

The Cook was built at Lunenburg in 1918 and was owned by Ritchie Bros., of Riverport.

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St. John, N. B.:—Activity along the water-front in St. John, N. B., is very marked since the opening of navigation for the winter season at this Port. No better form of Christmas cheer could have come to many homes in this locality. The notifications sent to the 'longshoremen to report for work at the various steamers was received with a great deal of gratification. Work has been very scarce, but now they are fully engaged loading and unloading steamers. Forty gangs of 'longshoremen, numbering 640 men, in addition to the ship carpenters, coopers and truckers are finding employment and these men bring the grand total to more than 1,000. Thus the outlook is reported very bright for the winter months.

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Detroit:—The last steamer to pass up through the Lachine and other St. Lawrence river canals was the fifty-year old steamer, "George W. Clyde," carrying a cargo of raw sugar from Philadelphia to Chicago. The "Clyde" served her time as a coastal trader, and after some years in this business it was found that she was outstripped in speed and carrying capacity by newer and more up-to-date steamers. She was therefore consigned to a Philadelphia anchorage, and recently was purchased by the Chicago Lines Municipal Piers Company. After examining the steamer Captain D. S. Kindell reported that her aged ribs and plates had survived a buffetng in the Gulf of St. Lawrence and that with her 35-foot beam and 265 feet over all, she was just capable of being able to squeeze through the locks in the Welland Canal. The steamer had a rather eventful passage up the river and lake. She was once lost in a snowstorm on Lake Ontario and finally managed to make the Welland Canal and get through to Lake Erie. At Buffalo the weather was very severe and she broke a propeller and was dry docked there. The last reports received were that she was expected to winter in the St. Clair River, her cargo of sugar being delivered by rail, and will proceed to her destination in the spring.

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Montreal:—A few weeks prior to last Dominion election the Hon. C. C. Ballantyne, ex-Minister of Marine and Fisheries, announced that his department had awarded a contract to the Montreal firm, Canadian Vickers' Limited, for the building of an ice-breaker for the St. Lawrence river work. This announcement was hailed with a great deal of pleasure by the shipbuilders in Montreal, and it was expected that the contract would kept 600 men busy for about 10 months. On January 9th it was officially announced that the new Government had ordered work on this ice-breaker to cease and the contract has been held up in the meantime. No official reason can be given for this act on the part of the Government, but, however, there have been numerous rumors to explain, in part, their action. Among these rumors is one that states that the old ice-breaker "John G. Hazen" built in 1914 to the order of the Canadian Government for the St. Lawrence River work at Canadian Vickers Limited, and which was sold at the outbreak of the war to the Russian Government is now for sale. This steamer, it is stated, can be purchased for a figure in the neighborhood of half a million dollars. As the contract price for the new ice-breaker was about one and three-quarter million dollars it will be seen that there is a big difference in the two figures. However, there is more to the situation than these figures would indicate. The "John D. Hazen" has been subjected to some very severe service and has been sunk twice in addition. For the last 18 months she has been tied up at the port of Cherbourg, France. It is claimed by the French Government that she is now their property while the Russian Government also claim ownership of the steamer. This is a rather complicated situation and trouble no doubt will result if a purchase is completed and thus it will be difficult to get the clear title to the steamer. In addition, the sum required to repair the ice-breaker is a figure that is very uncertain. It may turn out, if a purchase is completed, that the saving effected over the building of a new boat, will be largely, if not all, absorbed when the bill for repairs has been paid. At this writing the contract with Canadian Vickers, Limited, has not been absolutely cancelled but rather work on it has been held up. Rumors are circulated to the effect that when slight changes in the original designs have been completed the contract will be re-awarded. On the other hand there is absolutely no confirmation of a purchase having been made of the old "John D. Hazen." The firm of Canadian Vickers, Limited, and also representatives of the labor circles affected, are keeping in constant touch with Ottawa and it is expected that some definite decision regarding this situation will be made at an early date.

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Port Colborne:—The limits of the harbor of Port Colborne within the meaning of the Canada Shipping Act have been defined as follows:—All the water of Lake Erie, lying to the north of a line drawn from the extremity of Georgian Point to the extremity of Point Albino.

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Chatham:—An exciting incident occurred early in January on the St. Clair River near Port Lambton. Two ferrymen, Herbert Roberts and Bert Hart, were taking three passengers across the river, when the boat was struck by a large piece of floating ice, and a hole torn in her side. The five men had to scramble out of the boat, and make their way to shore over the lakes of moving ice, jumping from one to the other. All reached shore safely.

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Kingston:—There are hopes for a fair amount of work in the ship repairing works for this winter. Several of the Canada Steamship Lines vessels are laid up here, and representatives of the line have been getting prices from local contractors on the necessary repairs. Altogether there about forty steamers in the harbour, a large number of them belonging to the C. S L.

St. Catharines:—The engineering department of the Ministry of Railways and Canals are to report on the feasibility of placing a turning basin in the Welland Canal near St. Catherines. A turning basin will also include docking facilities.

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Brockville:—It is understood that the George Hall Coal Co., are in the market for two new steamers for their coal carrying fleet. These vessels would be of maximum Welland canal size, and be suitable for ocean going as well as lake traffic. The fleet of the company at present consists of 16 steamers, besides tugs and barges.

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London:—In 1919 the Moore Line sold thirteen steamers to the Western Shipping Co. of Cardiff, for £1,804,000 or an average price of £139,000 each. Sir Walter Runciman who as head of the Moore Line had sold the steamers to the Western Shipping Co., has recently bought them back from the receiver of the latter company for just one fourth of the price they were sold for in 1919.

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Montreal:—It is proposed to build a grain elevator at Maisonneuve, early next spring to have a capacity of 10,000,000, bushels. The reason for this is that the port of Montreal was considerably overtaxed as regards grain capacity last season, and the harbor commissioners had to refuse business on this account. The new elevator will enable ships to load with grain without entering the upper harbor at all.

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London:—It is expected that shortly the old S.O.S. call at sea for a vessel in distress will be superseded by an automatic signal. This signal will consist of three beats repeated at four second intervals, and if given from a sinking ship its effect is to ring an alarm bell on any vessel within reach. This does away with the chance of the S.O.S. call being confused with other signals.

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Port Arthur:—The keel of the new freighter that is to be built in the yards of the Port Arthur Shipbuilding Co. will be laid about the middle of March, according to advices from that city. The work of getting out the drawings is proceeding and a model is being prepared, and as early a start a spossible will be made, according to Mr. J. H. Smith of Cleveland, who will superintend the building.

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London:—Advices from London show that during the last two months there have been completed 17 motorships, with a total of 135,000 tons deadweight, and in addition to this eight vessels of the same class have been launched totalling 58,700 tons. There is an ever growing tendency on the part of shipowners to build the ship fitted with internal combustion engines, due to the proven economy of this type of motive power.

Washington:—Considerable opposition is developing in the House against the report of the Commission favoring the construction of the deep waterway system from the lakes to the sea. Practically all those in favor of the report are representatives of middle Western States, while the opposition comes from the East. It is said that it will be twelve months before the report is finally dealt with by Congress.

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Charlottetown:—Mr. A. E. McLean, the newly elected member for Prince Co. P.E.I. and the Hon. J. E. Sinclair have been calling attention to the fact that there is only one car ferry operating between Prince Edward Island and the mainland, and if anything should happen to her, there is no vessel to take her place. They suggest that if the Government build a new ice breaker, that she be constructed in such a manner that if required she could take the place of the ferry, acting as icebreaker and ferry boat too.

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Ottawa:—The fact that the Canadian Government Merchant Marine has operated at a loss during the year 1921 came as no surprise to those conversant with conditions. The year had been a bad one for shipping in general, and the C. G. M. M. was no exception to the general rule. While the department of Marine says that the proper place to present the affairs of the fleet to the Government is the Department of Railways and Canals, under whose jurisdiction they come, President Hanna of the Canadian National Railways takes the view the C.N.R. had the ships handed over to them by the Department of Marine, and all they could do was to operate them to the best of their abiity.

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Ottawa:—During the year ending March 31, 1921, the shipping constructed in Canada amounted to 95,838 tons. During the year ending March 31, 1920, 164,074 tons of shipping was built. During 1921 34,623 tons of shipping with a value of $8,456,573 was sold to other countries. In 1920 the tonnage sold to other countries was 53,407. The value was $17,819,477. In 1868, the first year for which statistics are given, 87,230 tons of shipping was constructed in Canada. This industry reached its highest peak in 1875, when 188,098 tons reached the ocean. From 1875 tonnage constructed each year gradually declined until in 1896 only 10,753 tons passed from Canadian yards. After 1896 the amount increased until another peak was reached in 1920. In 1918, 53,912 tons of shipping was constructed and the figures given show that this more than doubled in 1919 and more than tripled in 1920. Of the total of 220 vessels built in the fiscal year ending March 31, 1921, 139 were steamers and 81 sailing vessels The steamer tonnage was 80,174 and the sailing vessel tonnage 15,664.

BRITISH OCEAN RECORDS

The conversion of the "Acquitania" from coal to oil burning has resulted in an increase of speed, and on a recent East-ward voyage the vessel touched the speed of 26.66 knots a figure previously reached by the "Mauretania." Now that the "Mauretania" itself is undergoing conversion to oil-burning, a still higher record is expected to be achieved.

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CARGO CARRYING AEROPLANES

A novel type areoplane is being constructed by a British company under the auspices of the British Air Ministry. It is designed mainly with a view to carrying capacity, speed being sacrificed to some extent in order to give more scope for cargo. Careful experiments will be made with this aeroplane to decide certain disputed points about the actual cost of carrying goods by air. Aircraft optimists hold that for long distances the cost of carriage by air will be very little in excess of road motor charges. The capacity of the machine will be three tons.

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BUILDING THE BRITISH TRADE SHIP

Active preparations are being made for the "Trade Ship" which is to be built to carry samples of British manufactures and other products on exhibition to all parts of the world. The builders of the ship are obtaining provisional tenders for the various parts and fittings. Not only will the ship itself be a demonstration of British engineering, but every part of it will constitute an exhibit. Care is being taken to select only those component parts which will represent the best in British production. Keen rivalry is expected in this connection. The vessel is expected to sail from London in the autumn of next year on a voyage which will occupy eighteen months.

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WIRELESS INSTALLATIONS

The Canadian Marconi Company have arranged with the Canadian Pacific Steamships, Limited, for the equipment of the Trans-Pacific steamers "Empress of Canada" and "Empress of Australia" with the most comprehensive range of the latest type of wireless apparatus. This will enable the steamers to make the fullest possible use of the latest developments in radi-engineering as (a) a means of securing additional safety for passengers and crew, (b) an aid to navigation, and (c) long-distance telegraph service.

The equipment in question comprises a Direction-Finder, an "aid-to-navigaton" spark set, a complete emergency equipment, and a long-range continuous-wave valve transmitter and receiver.

The Canadian Marconi Company are also fitting Direction Finding apparatus on the Reid Newfoundland Company's Cabot Straight Mail Steamer "Kyle."

THE BRITISH TRADE FAIR

When the eighth annual British Industries Fair opens in London and Birmingham on the 27th February for its two week's run, buyers will be there from all parts of the world. This is the information received from the British Government Department of Overseas Trade which is responsible for the organization of the Fair.

The British Trade Commissioners in Canada, who have their offices at 248 St. James Street, Montreal, 260 Confederation Life Building, Toronto, and 610 Electric Railway Chambers, Winnipeg, state that many Canadian buyers will attend the Fair. Invitation cards and full particulars are being issued by the Commissioners locally.

The goods exhibited in the London Section comprise boots, shoes, fancy goods, paper and stationery, pottery and glassware, scientific and optical goods, chemicals and drugs, jewellery, electroplate, cutlery, watches and clocks, toys and games, sports goods, haberdashery, furniture and musical instruments.

Especial attention is directed to the impressive and comprehensive display of metals, hardware and engineering exhibited at the Birmingham Section of the Fair. Here the goodwill possessed by the manufacturers of Birmingham throughout the world takes tangible form, and the buyer may inspect everything of interest produced in what is universally acknowledged to be the "Workshop of the World."

Many manufacturers will welcome a visit from the overseas buyer to their works, where he may not only see the goods being manufactured, but also the facilities for adapting them to the requirements of his market.

Since its inception in 1915 the British Industries Fair has grown until it is to-day the most important national trade fair in the world. In fact, one of the great difficulties with which the organizers have had to contend has been the lack of adequate buildings, for the Fair has grown to such an extent that it has been no easy matter to adhere to the policy of housing each section under one roof. To those who are familiar with the continental fairs which are held in innumerable separate buildings scattered throughout the length and breadth of a city, the advantages of such an arrangement will be obvious. For the 1922 Fair it has fortunately been possible to secure enough additional accommodation both in London and Birmingham to provide not only for the annual growth of the Fair, but also to find room for the great industries which centre in and around Glasgow. Textiles, however, will not be included in the Fair.

Invitations are issued to buyers alll over the world by the British Government and in the Dominions by its Trade Commissioners. In Canada, their addresses are: 249 St. James Street Montreal, 260 Confederation Life Building, Toronto, and 610 Electric Railway Chambers, Winnipeg. The visit to the Fair each year by thousands of buyers from the Dominions and all parts of the world has resulted in the actual placing of an enormous volume of orders for commodities of all kinds. With the progressive re-establishment of Britain's industries, so seriously disorganized owing to the war, it is confidentially anticipated that the 1922 Fair will show a marked advance on its predecessors, whether judged by volume, diversity, value or excellence of the product.

Arrangements are made for the convenience of buyers in visiting the Fair, special writing rooms being set apart for his use as well as special post offices to deal with his letters and telegrams. A first class restaurant service makes it unnecessary for him to leave the Fair buildings to obtain his meals.

Visitors to the Fair also receive valuable assistance from the manner in which the catalogues of the Fair are produced. Instead of being mere lists of the names of the exhibbitors, they are books of reference in which they can find a classified index of every article exhibited. Supplementary pages contain comparative tables of English and foreign weights and measures and the monies of all the principal countries are compared with their English equivalents. The catalogues are handed gratis to all visitors to the Fair from overseas.

The careful grouping of exhibitors according to their various trades is of the greatest help to the buyer, as he finds side by side with well-known firms, businesses of which he has probably never heard, but which are of equal interest. To trade buyers, new sources of supply are as important as are new markets for manufacturers.

STEAM PIPE EXPLOSION FROM WATER HAMMER ACTION

The Board of Trade have issued, under the provisions of the Boiler Explosions Acts, 1882 and 1890, a report of a preliminary inquiry made by I. F. Blenkinsop, one of their surveyors, with regard to the circumstances and cause of a steam explosion which occurred on August 25, 1920, at the New Hall-lane Mill, Preston, in the occupation of Messrs. Paul Catterall, Son and Co., (1920) Limited. Fortunately no fatal result ensued, but one man was somewhat scalded.

The pipes, which were new, having been made by Messrs. John Spencer, Limited, Globe Tube Works, Wednesbury, the previous March, formed part of the main steam line leading to a new engine which had recently been installed at the mill. The steam line was made up of a number of lap-welded steel pipes, 9-in. internal diameter, 5/16 in. thick, with screwed-on flanges, 16-in. diameter, jointed together by twelve ⅞-in. bolts, having a pitch circle 14-in. in diameter. The mean distance from the boiler-house to the engine stop valve was about 80 ft., but with the several horizontal and vertical leads, the total length of steam pipe used was approximately 146 ft., Hydraulic tests were witnessed on the pipes to a pressure of 280 lb. per square inch by an inspector of the Vulcan Boiler and General Insurance Company, Limited, at the maker's works, in March 1920. At the time of the explosion, the new engine, boilers and economzers were insured by this company, but the steam pipes were not covered by the policy.

Two lengths of steam pipe in the engine house were damaged by the explosion; one contained a longitudinal crack at the weld, open at its widest part, ½ in., and 9 in. in length, and the other a ragged hole, 7 in. from the weld, which had a maximum width of opening of 4 in., allowing steam and water to escape into the engine-house; the pressure of steam being about 140 lb. per square inch.

The explosion was due to water hammer action.

In his report to the Board of Trade, under the heading of "General Remarks," Mr. Blenkinsop writes as follows:

"The work carried on at the New Hall-lane Mill is cotton spinning. Steam is supplied by three Lancashire boilers, each 30 ft. in length, by 8 ft. 6 in. in diameter, at a pressure of 180 lb. per square inch, and conveyed to the engine by a long range of lap-welded steel steam pipes, 9 in. in diameter. Before steam reaches the engine stop-valve it passes through a separator, to which is connected a steam trap, suitable for a pressure of 180 lb. per square inch. The power is distributed to the mill by means of rope gearing. A new engine built by Messrs. Yates and Thom, Blackburn, was recently installed, when new steam and feed pipes were fitted; the work was carried out by Messrs. Dryden and Son, Preston, whose workmen were still employed on the plant at the time of the explosion.

"On August 20 and 21 satisfactory preliminary trials of the engine were made. On Sunday, August 22, steam was used for the barring engine to place ropes on to the driving pulley, when it was noticed that the steam trap connected to the separator was not working properly, and it was decided to fit another trap. As a temporaray measure, the defective steam trap was removed and a straight-through drain valve and pipes, 1-in. bore, were fitted, the pipes being led through the engine house door, discharging into the mill yard. These alterations were completed on Monday, August 23, when a final trial of the engine, under load, was made, preparatory to supplying power to the mill by the new plant on the following morning. This trial was quite satisfactory.

"At the end of the trial the mill engineer found that he could not shut the engine house door without removing the end length of the temporary drain, which he removed, and as the discharge from

the drain came into the engine house, he closed the drain valve, leaving it closed overnight. In mill practice the boiler stop valves are left open for heating purposes, steam traps being fitted to prevent accumulation of water in the steam pipes; the steam pipes were formerly well covered with non-conducting material to prevent condensation. In this had only commenced, so that the drain valve being shut water would collect in the steam pipes overnight.

"The mill engineer states that his first action on the morning of the explosion was to open the engine house door, connect up the end length of drain pipe, and open the drain valve. The engineer, who was accompanied by the engine-builders' foreman, states that water came out of the drain pipe full bore. He then proceeded to oil the engine prior to starting, and states that about 7 minutes after opening the drain valve he heard a loud rumbling noise which was followed by a rush of steam. At this time there were present in the engine house, the mill engineer, the engine-builders' foreman and Thomas Scohill, a laborer, who was employed assisting the pipe coverers, and was injured by the escaping steam and water.

"The damaged pipes were taken down and repaired; the pipe which opened out at the weld was fitted with a patch 2ft. 3in. long, by 12in. wide and ⅜in. thick, riveted only ⅝in. rivets at 2in. pitch. The edges of the patch were electrically welded. The other pipe was repaired in a similar manner, the patch being 2ft. long by 12in. wide and ⅜in. thick. After being repaired, these pipes were hydraulically tested to 270 lb. per square inch and replaced. A new steam trap has since been fitted, which is working satisfactorily."

Mr. Carlton, engineer surveyor-in-chief to the Board of Trade, in his concluding "observations" says: "The conditions obtaining at the time of the explosion clearly point to the action of 'water hammer' as the cause; and it would appear that those in charge of the plant were not apparently aware that the clearing of water of condensation from a range of steam pipes whilst in open communication with the boiler is a most dangerous practice, and in this particular case the shock of 'water hammer' was most violent."

MYSTERY TIDES

The hitherto unaccountable action of the tides of Miramichi Bay has now been solved. The diurnal tides are unequal, and for years an explanation of the reasons for this inequality has been sought by the officers of the Tidal and Current Service Branch of the Naval Department. A definite analysis of the tide action in Miramichi Bay has recently been arrived at; and in the Tide Tables for 1922 which are now being distributed, it is indicated for the first time which of the two tides of the day is the higher.

It has long been known that the diurnal inequality of the tide is reversed in regard to the two tides of the day, across the width of the Gulf of St. Lawrence, between St. Paul Island and Miramichi Bay. This gives rise to much complexity, but a definite relation between these two points has now been discovered.

The new information which results, will be of great advantage to shipping interests; as in future, captains will only need to refer to the Tide Tables to see which tide in the day will be higher. This is of special importance in Miramichi Bay, because of the bar at its mouth which has to be crossed. The difference in the rise of the tide is often as much as two feet; and vessels leaving Chatham can now gain this advantage by choosing the higher tide of the day, thereby enabling them to take on a considerable additional amount of cargo.

CANDIDATES SUCCESSFUL IN EXAMINATIONS

The Department of the Naval Service announce that thirty-nine (39) candidates were examined during the month of December, 1921, of which the following were successful and obtained Certificate of Proficiency in Radio telegraphy:

1st Class (Commercial)

Name.	Address.
Aveling, A.	Cape Race, Nfld.
Best, E. G.	Truro, N. S.
Bombardier, J. L. E.	Montreal, P. Q.
Durie, R. V.	Benito, Man.
Carman, H. G.	Vancouver, B. C.
MacDougald, D. S.	Shediac, N. B.
Miller, H. J.	Cape Race, Nfld.
Millette, J. P. P.	Montreal, P. Q.
Sutherland, W. M.	Trenton, N. S.

Amateur

Adams, C. M.	Winnipeg, Man.
Allardyce, V. P.	Vancouver, B. C.
Bell, G. D.	Winnipeg, Man.
Buchanan, W. G.	Winnipeg, Man.
Clements, J. A.	Vancouver, B. C.
Collin, J. B.	Vancouver, B. C.
Good, N. A.	New Westminster, B. C.
Goodmanson, T.	Winnipeg, Man.
Longley, C. E.	Vancouver, B. C.
Mason, E. P.	Vancouver, B. C.
Macpherson, W. G.	Vancouver, B. C.
Michelmore, H. R. L.	Vancouver, B. C.
Nicholson, E. L.	Winnipeg, Man.
North, F. J.	Winnipeg, Man.
Pugh, A. G.	Winnipeg, Man.
Rutland, F. E.	Winnipeg, Man.
Speechly, W. G.	Winnipeg, Man.
Stevenson, F.	Winnipeg, Man.
Thomas, W. T.	St. Vital, Man.
Trotter, C.	Vancouver, B. C.
Tufts, S. St. C.	Vancouver, B. C.
Mowatt, H. B.	Vancouver, B. C.

FLYING IN A FOG

The maintenance of a continuous service by aircraft depends upon several factors, one of the most important being the ability to fly during foggy weather. Direction-finding by means of wireless telegraphy has been of great assistance in this direction, but a much more elaborate and promising aid is that recently devised by a British engineer. The apparatus consists of an upper row of lamps controlled by a gyroscope, and an air speed indicator the pilot is given all the information he needs to fix his position during fog. Point-to-point flying can therefore be undertaken with the certainty of reaching the desired destination. The speed of the machine through the air, the rate at which it is turning, the direction of sideslip, and the movement required to keep the correct course, are all recorded. Experiments with this apparatus have been going on for over 18 months and the British manufacturers recommend its use with confidence.

PORTLAND CEMENT

The U.S. Geological Survey, department of the interior, say that the movement of portland cement continued on a large scale throughout September, more than 11,300,000 barrels having been shipped from mills. Shipments of portland cement during the third quarter of the year were approximately 33,970,000 barrels, establishing a record for this quarter. For the nine months ending September 30, 1921, the shipments amounted to 74,045,000 barrels, which exceeds the former record volume moved in the corresponding period of 1920. Favorable operating conditions are indicated by the large September production of 10,027,000 barrels of finished cement, which established a record for that month. The average daily production was greater than that of August, and had there been as many days in September as in August the September production would have shown the larger total. Production for the third quarter likewise established a record, and for the nine months ending September 30 the production was about 99.8 per cent of the record quantity made during the period last year.

The Bureau of Foreign and Domestic Commerce, department of commerce, reports that imports of hydraulic cement in August amounted to 10,988 barrels, valued at $216,892. The exports of hydraulic cement in August were 84,538 barrels valued at $3,253,463, the total exports for the eight-month period were 848,971 barrels, valued at $3,253,463.

The Newfoundland Government has decided to pay a bounty of $30 per ton on all schooners over 25 tons, and up to and including 50 tons register built on the island this winter and fully equipped and ready for sea about July 1st, 1922. The object is to assist the merchant marine to replace the numerous vessels lost last year and to provide employment for those out of work.

The Canadian Department of Trade and Commerce is inviting tenders, which will be received up to January 31st, 1922, for a weekly or fortnightly steamship service from Halifax or St. John to the West Indies and British Guiana.

About 41 men were taken on the Collingwood Shipbuilding Co.'s drydock on January 3rd at Kingston, Ont., and were set to work on the steamer Keybell. It is expected that more men will be taken on during the week.

WELDING BY CLOCKWORK

In shipbuilding and in many engineering operations, it is necessary to fix brass studs and other small parts to iron plates. This operation is usually performed by drilling holes in the plate, each hole being drilled separately. By means of an ingenious invention recently perfected by a British firm, the process is carried out in a few seconds by electric welding. The working of the machine is almost entirely automatic from the moment the stud is placed in position. Each size of stud requires a different time for welding it to the plate, and the machine can be set to give exactly the period required to make a perfect weld. The tests which have been made proved that the machine is able to weld 120 brass studs within an hour. It might be thought that welding does not give such a firm arrangement as screwing the stud into a hole in the plate, but when the welded stud is hammered the brass will break before the weld yields. Another advantage of the machine is that work can be satisfactorily carried out by semi-skilled labor.

THE BEHAVIOUR OF PUMP-VALVES

The results of exhaustive experiments made on six types of valves are summarised in this article, which is abstracted from "Forschungsarbeiten aus dem Gebiete des Ingenieurwesens," No. 233. The author obtained a number of diagrams of the movements of the suction and delivery valves of pumps and of the pressures below the suction valves, in the pump chambers, and above the delivery valves. Particular attention was paid to the intensities of the sounds associated with the opening and closing of the valves. For the suction valves noises occurred on closing, and were soft when the final velocities of the valves were about 3-in. per second, and loud when the velocity exceeded 5-in. per sec. These velocities and the intensities of the blows increased with increase of spring loads on the valves. The blows of the delivery valves increased with increasing lifts and diminishing spring loads. Rather severe water-hammer blows were delivered against the delivery valves just before they opened. Apparently a vacuum is formed through the closing of the suction valves just before the end of each stroke. These blows on the delivery valves increase in violence with increasing spring loads on the suction valves. Several other details are discussed, including the efficiency of pumps.—L. Krauss ("Ver. deu, Ing.")

Catalogue No. 50 just issued by the Julian d'Este Company, Boston, deals with Curtis Engineering Specialties, including pressure regulators, for steam and water, steam traps, damper regulators, relief valves, pump governors and special miscellaneous valves.

PREVENTING AMMMONIA LEAKAGE

The advantage of permanence, lower cost, and ammonia saving, gained by eliminating joints in ammonia pipe coils by Thermit welding as compared with installing ammonia flanged connections is being appreciated according to reports by the Linde Canadian Refrigeration Company, Montreal, Que., which handles refrigeration machinery for industrial plants and ships.

Since adopting this pipe welding process in 1918, the company has ordered material for welding in the neighborhood of fifteen miles of 1¼ inch extra heavy steel and wrought iron pipe for refrigeration units installed in a large number of industrial plants. The length of coil used varies from 500 to 5,000 feet. The whole coil is made up in sections of endless pipe. These sections are flanged and bolted together on the job. The sizes of the sections vary from 6 feet to 36 feet in length, and from 3 pipes high to 20 pipes high. There is one weld for every 20 feet of pipe used. No screwed fittings are used on any of these installations, but instead the pipe is bent to suit, and male and female flanges are connected together using a lead gasket. The coils are flanged before being shipped and tested to at least 150 pounds hydrostatic pressure test. In very few cases has it been found necessary to cut out a weld.

LOSS OF HEAT FROM BARE STEAM PIPES

FOR bare steam pipes this loss may be taken as 2.7 B. t. u. per hour per square foot of surface per degree Fahrenheit difference between the temperatures of the steam and the outside air. Thus, if the pressure of the steam is 120 pounds absolute, the corresponding temperature being 341°, and the temperature of the air 60°, then the loss per hour per foot length from a 4-in. steam pipe, the external surface of which is will be $1.178 \times (341-60) \times 2.7 = 894$ B. t. u. The corresponding condensation can be found by dividing this heat quantity by the latent heat of steam at the given pressure. In the example given above, the latent heat of steam at 120 pounds pressure, absolute, is 877.2 B. t. u. Therefore the condensation per hour per foot length of pipe is $894 \div 877.2 = 1.02$ pounds. — National Tube Co.

Waterfront interests are speculating as to the feasibility of trying to salvage the Japanese steamship "Fukui Maru." which was deserted in a hurricane off the coast a few weeks ago. The vessel itself is old, but she carried a valuable cargo of lumber. At first it was reported that she carried nothing but grain, and all thought of salvage was abandoned, but the denial of that, coupled with the statement that the steamship was loaded down with lumber, has made salvage men more hopeful.

BUSINESS PAPERS EXTREMELY VALUABLE

IT WAS the reading of a business publication that inspired Henry Ford to quit the farm and seek employment which would help him to build a "horseless carriage" such as he then read about. It was by reading a business publication that George Eastman got the idea of establishing what has become by far the greatest establishment of its kind in the world. It was the reading and studying of business writings that started Frank A. Vanderlip on a career which landed him in the presidency of the largest national bank in America. Edison reads more business periodicals and books than perhaps any other man in America; he assured me that he couldn't afford not to.

Cyrus H. K. Curtis once told me, continues an editorial in Forbes Magazine, that he first conceived the idea of creating the Saturday Evening Post when, as a youth, he read a story about a young man who achieved dazzling success in business. It was reading and studying the business achievements of John D. Rockefeller that fired James B. Duke with ambition to become in tobacco what Rockefeller had become in the oil industry.

Only the other day a salesman of one of the many business "courses" now in vogue, told with great gusto that he had just sold his "course" to the president of a very large railroad, Daniel Willard, of the Baltimore & Ohio. J. Kindleberger, the famous paper manufacturer, tells how the reading of a business book caused him to organize what became a very successful enterprise.

Recognizing the infinite value of business books, "Forbes" has decided to open a new department to encourage the reading and studying of them by those who are ambitious to make headway in the world. As one means of emphasizing the benefits which can be derived from business books, they are offering $250 in prizes for letters answering the question, "Which Business Books Have Helped You Most, and How?"

It has become not uncommon, concludes the article, for employers to get a line on the kind of reading done by employees being considered for promotion. I once heard of an employer who made an excuse to visit the home of an employee whom he was thinking of promoting, but when the only reading matter within sight was a popular weekly and second-rate fiction, the employer concluded that he had better promote someone who devoted at least part of his spare time to reading periodicals and books calculated to widen his knowledge of his business and broaden his mentality.

The man who reads this story is to be congratulated, because he too is a reader of a business paper, and is thus building upon a solid foundation.

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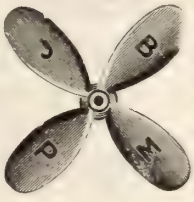

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This remarkably timely article appears in

MacLean's Magazine *for* JANUARY 15

The West Is Still There!

***By* Charles Christopher Jenkins**

A staff writer of MACLEAN'S MAGAZINE was sent West a few weeks ago to find out what there is to these 'blue ruin' stories. He returns with a huge grist of facts, and reports that, although hard hit in many ways, the West is, as everyone who knows it would expect, breathing the virile and vigorous spirit of constructive optimism.

Included in this article are striking and timely messages to the readers of MACLEAN'S from Hon. T. C. Norris, Premier of Manitoba; Hon. W. M. Martin, Premier of Saskatchewan; and Hon. Herbert Greenfield, Premier of Alberta.

"Have confidence in us; we'll come through!"—this is the key-note of an article for which Mr. Jenkins travelled nearly ten thousand miles to get definite and accurate facts for MACLEAN'S readers.

Other Big Fact and Fiction Features in this issue of MacLean's

CANADA'S CARIBOU CROP—Vilhjalmur Stefansson argues that reindeer-steaks will soon find their place on the menu of thousands of Canadian families.

WHAT CAN THE MOVIES TEACH?—Nicholas North's investigation of the "Menace" of the movies; they should be excellent educators.

THE PIPES OF DEATH—an exotic and thrilling story of a little-known country by "Sapper"—H. C. McNeile.

THE SAIL DRAGGER—by Frederick William Wallace. The first installment of a three-part novelette written by a Canadian who knows, loves and understands the sea and can tell a vigorous, dramatic tale.

THERESE AND GERMAINE—An Arsene Lupin detective-mystery story, from the fertile pen of Maurice LeBlanc.

CONVERTIN' ELDER HAWKINS—Archie McKishnie returns with the first of a new series of Lenix Ballister negro stories.

MOSTLY SALLY—Pelham Grenville Wodehouse's cheery, rollicking serial.

And in this issue there is a particularly strong Review of Reviews Department

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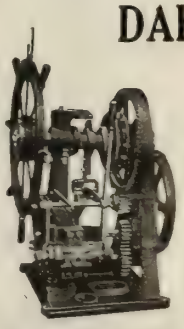

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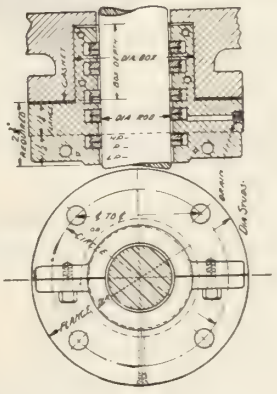

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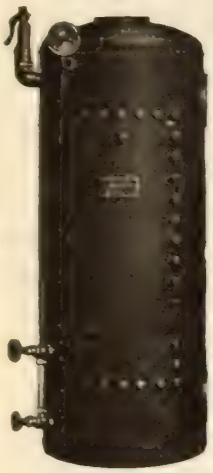
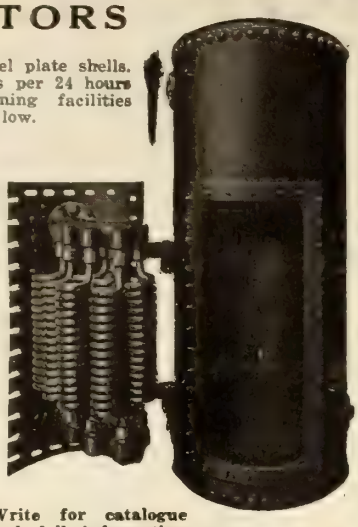


Heater



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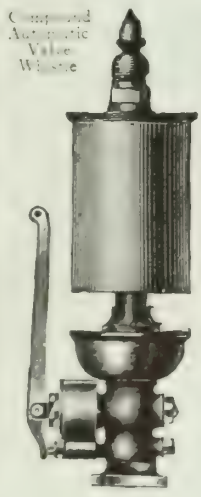

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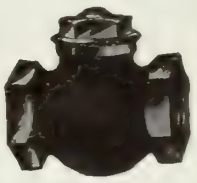

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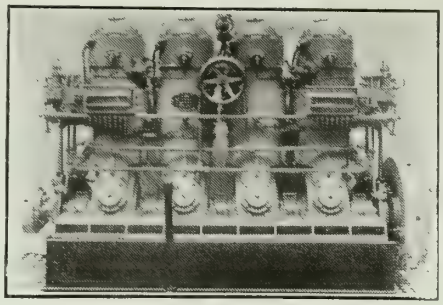

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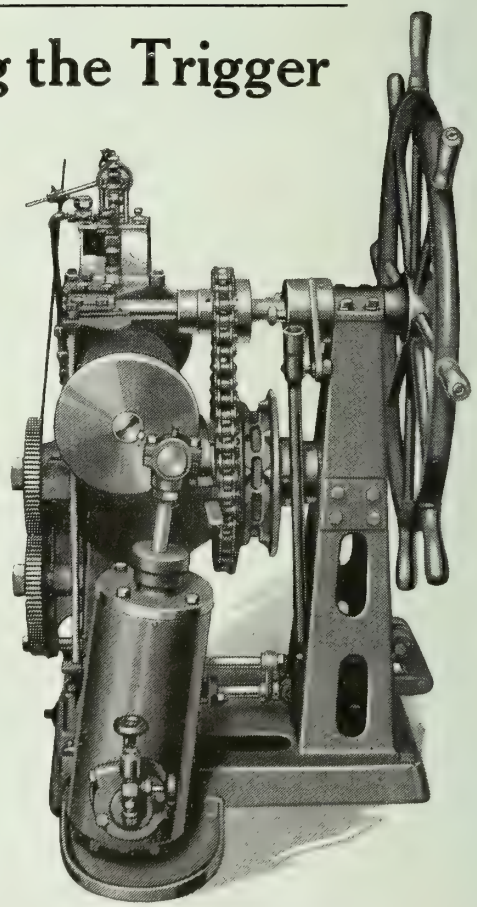

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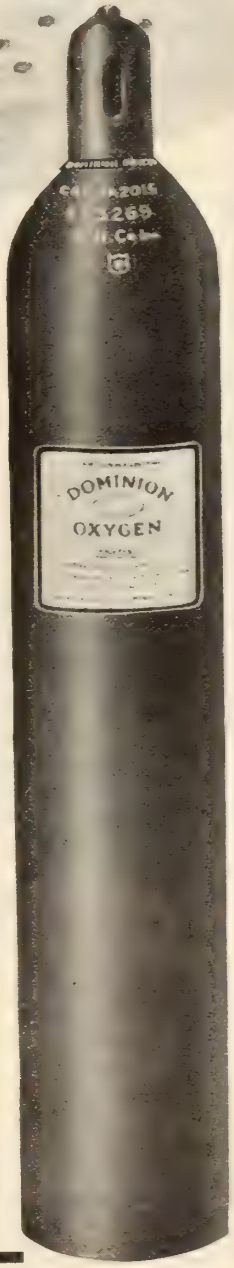

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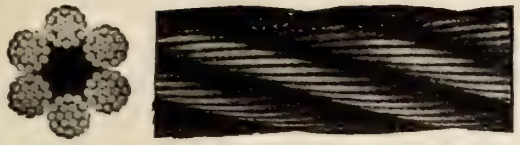

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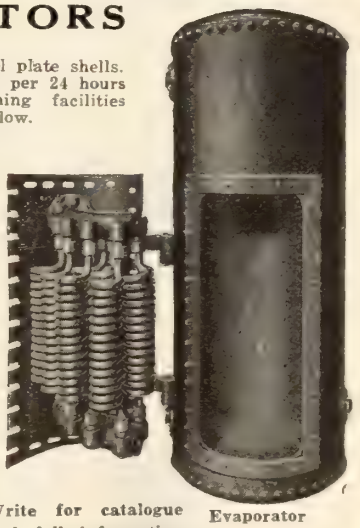

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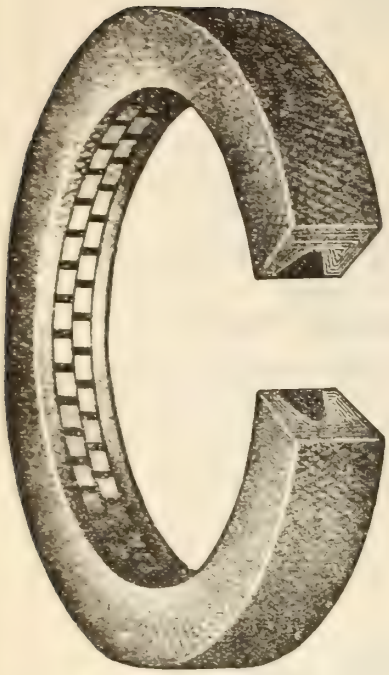

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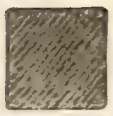
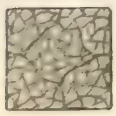


SERPENT "A"



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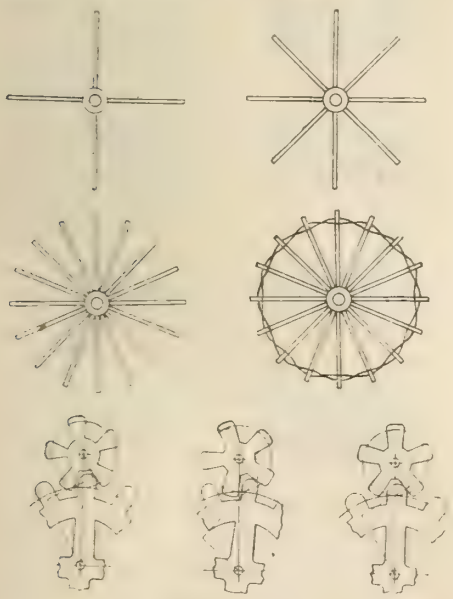
A New Form of Toothed Gearing

The Necessity of a Form of Gearing Which Would Possess Sufficient Flexibility to Adapt Itself to Distortion Such as Occurs in Marine Work, Has Brought Forward the Ideas Here Set Forth

By W. RUS. DARLING
Read Before The Institute of Engineers and Shipbuilders In Scotland

THE PROBLEMS of power transmission have occupied the minds of many succeeding generations of engineers since Archimedes discovered the properties of the lever, gave unlimited extent to the notation of numbers, and founded the method of indivisibles or exhaustions which led up to the finest discoveries in geometry, and some of the greatest modern inventions. Following Archimedes, Appolonius of Perga, who was the first to derive the conic sections from a single cone, Pappus, Diocles and Nicomedes, who invented some of the higher curves, even Diophantus, who gave us the characters used in algebra, all helped towards the determination of that little curved line which encloses the form of a modern gear wheel tooth.

The higher geometrical science was originally applied to astronomical research, and enabled Aristarcus to expand immensely the conception of the solar system. By it Hipparchus sought to explain the apparent inequalities in the motion of the celestial bodies by the hypothesis of eccentrics and epicyles. Then mechanicians naturally followed



Figs. 1 to 7.

the discoveries of the great men of the Alexandrian school, and devised eccentric, elliptical, and planetary gears. From the same geometrical sources there came later square and triangular gears, and other less familiar variable speed devices.

It is commonly supposed that the greatest mechanical discoveries are the result of chance that the most celebrated mechanicians had no theoretical knowledge and that even famous mathematicians have failed when they attempted to put their ideas into practice. It is no doubt true that chance sometimes unfolds important inventions, and that useful results do not always follow the laborious investigations of the theorist; but it is necessary for this that the productive causes be of the very simplest kind. The chance mixture of some substances gave birth to important chemical combinations; two convex lenses, placed parallel to each other at a certain distance and directed to a distant point, indicated the principle of the telescope.

The First Gear

History tells us that the first gear wheel was composed of flat pieces of wood, arranged in the form of a cross, Fig. 1, which were made slightly longer in one wheel of a pair. This was not for the purpose of modifying speed or power, but to ensure engagement. Subsequent developments of this idea extending over centuries are illustrated in Figs. 2, 3, and 4. In the latter the extremities of the arms are stiffened by binding, and indicate the first approach to the modern toothed wheel. Previous to 1674 teeth were of no particular scientific form, but were merely more or less regular excrescences on the rims of the wheel and pinion. About that time Roemer, a Danish mechanician, first applied the epicycloidal curve with the object of securing uniformity of pressure and velocity.

Within the last 50 years makers of clocks, watches, chronometers and mathematical instruments shaped their wheel teeth to please the eye drawing them to an enlarged scale for better discernment then reducing them to the required size. Lancashire makers of watch wheels used the bay leaf as a pattern. It was not until the works of Camus were translated from the French that wheel teeth began to take a definite shape, and engineers and others realized that tooth designing was a science rather than an art and that only by following certain basic principles could they get uniform velocity, durability, and efficiency in their machines. Camus pointed out some of the limitations in toothed gears, for example, that pinions of a certain number of teeth were unsuitable for working with particular spur wheels, on account of the line of pressure being either outside or inside the pitch circle, Figs. 5, 6, and 7. In this connection it has long been considered unwise to have less than 14 teeth in any pinion, and in present-day work, whenever high ratios are required, involving pinions of small diameter, the teeth are made to a fine pitch with a corresponding widening of the face.

Tooth Pressure

This brings us down to modern times and the question of tooth pressures, which still awaits the final answer. It should be easy to determine, even in the laboratory, what pressures can be economically withstood by the various metals available for wheel teeth; but the great difficulty of maintaining, under certain conditions, the contact of wheel and pinion teeth along the whole face must be recognized, and also the possibility of intermittent point contact provided for in the design and material.

In the case of reduction gears for marine turbines, several devices have been tried, or proposed, for imparting flexibility and compensating inaccuracies of alignment and contact, but these have shown, naturally, better results in the testing department than in actual service. In so elastic a structure as a ship, no land trials can adequately indicate the behaviour of her machinery in heavy weather at sea. Even the most careful loading and trimming of cargo will leave the machinery in a different condition from that which prevails when running light. In a heavy sea there is a constant change of conditions, of torque, of alignment, of gear contacts, and of tooth pressures and it is not to be wondered at if heavily loaded gears wear more rapidly in heavy weather.

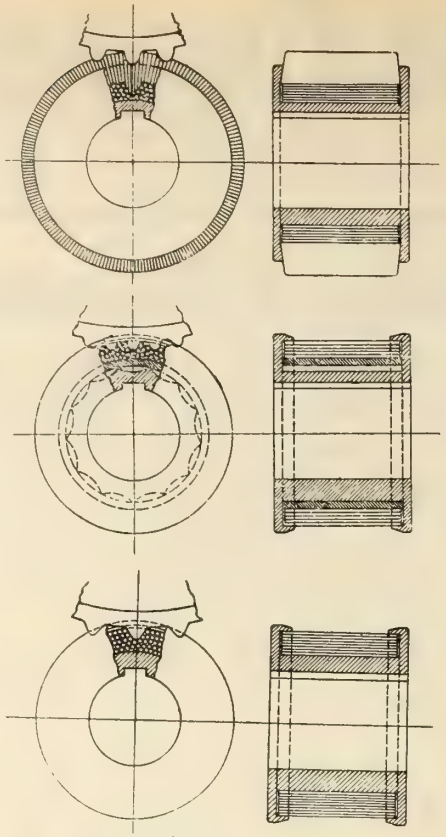
It is not proposed to make detailed mention of the best-known devices for

fighting these evils but some of the less familiar propositions may be of interest. From Holland comes the proposal to subject the pinion blank to the torsion at which it is expected to work when in service, and to retain it in that condition while the teeth are being cut. A special machine has been devised for this purpose, and while the idea seems practicable, it appears, at the best, to provide only for mean conditions. In the United States of America it was discovered that pinions which had lain in the store for some months before being fitted into place had become so much distorted that they had to be removed, and the teeth recut, after a brief and noisy trial run. This led to the suggestion that certain parts of machinery should be laid aside in a rough state for some time before machining, so as to get rid of internal stresses. A very sensible practice adopted in machine-tool works in Germany reminds one that more thought should be given to the prevention of gear troubles rather than to their cure. This practice is to balance all rotating parts, and, according to report, it materially reduces the noise and vibration usually ascribed to other causes.

If inaccuracies, either in the form of teeth, alignment, or balancing of parts, were the sole cause of power transmission troubles, there would be no excuse for their continued existence, but there are, and always will be, certain varying conditions on land and sea which must be conquered. To overcome these varying conditions, it may be necessary to revise some of the basic theories, a to steer clear entirely of makeshifts and half-measures. A theory is nothing else but a regular union, or methodical and connected arrangement, of all the facts relative to a certain natural or artificial effect; facts which are obtained by true experience. If a theory is perfect, and the product perfect, the resultant effect should be perfect. The tangible elements, being subject to the five senses, may be easily dealt with and eliminated, and with imperfect results before us the theory must bear the blame.

I have endeavored to outline the combination of sciences from which were evolved the modern wheel and pinion, but the new gear which I now propose to introduce comprises an element which, to the best of my knowledge, has never before been applied to practical mechanics. Before embarking upon any radical change in a time-honored theory or practice, it is well to investigate their origin and development, and determine whether the justification is to be found in an inherent or an incidental deficiency.

Figs. 8 to 19 show how the new Autopitch Gear developed in the mind of the inventor, the first form consisting of a wheel body with loose pieces of thin plate fitted close together round the rim, forming, as it were, a regularly laminated ring in the position usually occupied by teeth and their corresponding spaces. It may be interes ing to note how this idea originated. Having arrived at the conclusion that the old theories were unlikely ever to produce a gear which would in its own composition, cope with the varying conditions of wear, torque, alignment, expansion, etc., and that some of these conditions were natural and therefore permanent, the following list was made out to indicate requirements of a perfect gear:—



Figs. 8 to 13.

Strength, sufficient to ensure safety.

Durability, unlimited.

Adaptability, to all possible variation of conditions.

Elasticity, sufficient to absorb unavoidable vibrations of other parts.

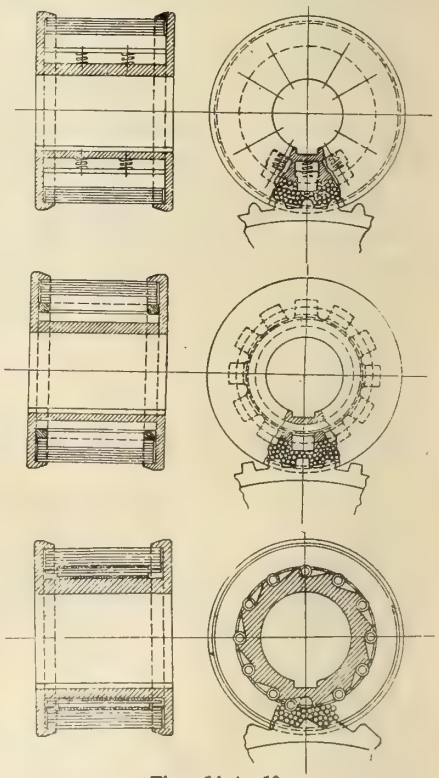
Noiselessness, approaching to silence.

Economy, both in cost of production and in power.

The first requirement, strength, seemed to be a matter of design plus material, the second, durability, of material plus design; the third, adaptability, seemed to lend itself less to ordinary methods of solution, and was set aside for a deeper analysis; the fourth, elasticity, seemed to depend on material plus design plus mounting; the fifth, noiselessness, would appear to be covered by the fourth plus workmanship; and the sixth, economy, may be accepted as secured by the realization of the other five.

On looking over this list it was apparent that the third requirement would be most difficult to fulfil, all the others being within the scope of modern knowledge and practice. With the time-honoured principle of the wheel and pinion still guiding the mind, a careful review of the reasons why this principle had failed to produce the desired adaptability, led to a concentration of thought on the pinion. Any trouble with the larger wheel of a pair was traced to the pinions which drive them, and it was then concluded that the solution of the problem might be found in a pinion which would have no pitch or form of teeth except that imparted to it by the engaging wheel. In other words, every driven wheel should be its own odontagraph. Simple minds mould their ideas from simple patterns, and, in this instance, having come to the conclusion above stated, the next step was to find some simple basic element or principle in nature, which, when viewed in the light of centuries of thought, experience and application, might point some untrodden way to the desired end.

The old mill wheel, with its continuous stream of water "gearing" into it, suggested possibilities. The mill stream adapts itself to almost any conceivable variation of a nature corresponding with those to be met with in mechanical gears. If the mill stream could be rolled up in a circle of suitable diameter, and provided with a shaft and bearings, it would form a pinion of the required adaptability. The absurdity is, of course, apparent, but in search for a new theory, apparent absurdities must be fully considered. And this same apparent absurdity is one of the most familiar features of nature; the feature which makes it necessary to build ships instead of railways. By the same method of reasoning the earth is revealed as a pinion, in constant motion, which, given the outside connection, might drive the universe. In the earth as a whole there is the embodiment of the idea of a mill stream revolving continuously round an axis. But in building



Figs. 14 to 19.

up a theory the "methodical arrangement of facts" must be complete. Imagine a paddle-steamer in a fixed position relative to the motion of the earth, and the wheels driven by the water revolving with the earth, and you have the idea of the mill stream mounted on an axis. Being in possession of a theory which appears to be sound, it remains to be seen whether it can be applied within the limitations of known or achievable practice.

It is probable that machine-cut teeth are not always correctly shaped, although the machines ensure the equality of their pitch. The bearing between opposing teeth may be only at a point, or points, instead of on a line the full width of the wheel. Even this line contact, when acquired, is not a mechanical ideal. Teeth slide as well as roll, and concentrated pressure and friction are, therefore, of great importance, and it is only the high quality of the material available that enables thousands of horse-power to be transmitted through one, two, or three lines of contact of one, two, or three feet lengths.

The value of the oil film and its existence between the engaging teeth are apparently accepted by authorities on gearing, and I sincerely hope that the acceptance is justifiable. If this film of oil is actually constant, it must be concluded that the pressure, the wear, and the transmission, are all effected through the medium of that oil film. It is estimated that in modern high-speed gears, the period of contact is about one-thousandth of a second, and from that fact is deduced the retention of the oil film.

From the foregoing it may be reasoned that the thicker the film the better, and, to carry this reasoning to its logical end, if the teeth of one wheel were eliminated and only the oil left, the theory of the endless mill-stream and the earth-driven paddle-wheel would be realized in practice. Absurd again, of course, but the question resolves itself into one of degree. How near can one get to a continuous oil film? The fluidity of oil makes it impossible to retain it in the form of a pinion rim of sufficient thickness to engage the teeth of the spur, so something else must be considered. If the oil is solidified the effect is no better, because, even if the radial forces suspended action, one revolution of the pinion would give it the impression of the spur teeth and destroy the continuity aimed at.

Reverting to the rational forms and materials of gear teeth, the finer the pitch the closer together, and therefore more nearly continuous, become the successive films of oil. If, however, the teeth are made too fine to carry the load, all the advantage would be lost, and it must be concluded, for the present at least, that the continuous film is impossible in practice; but there is an element which has not yet been considered. It is neither a fluid nor a solid, and yet possesses something of the nature of both. It is sometimes called a semi-fluid, and perhaps the only familiar form of it is to be found in balls. If a number of balls are poured into a vessel they will find a common level; if run out on a table they will behave much like water.

A less familiar form, perhaps, found in rollers, and here is an element which can only flow in two opposite directions. It is this fact, this limitation, which enables it to be harnessed in the form of an endless mill-stream within the compass of an ordinary pinion, Figs. 8 to 19. These figures show how this semi-fluid can be controlled and kept in its appointed place. The density of the element may be varied by having more or less rollers in a given space, and each roller being supported by all the others; their individual diameter does not materially affect their strength as a combination, which, in fact, forms one solid "fluid" tooth, equal in thickness to almost the circumference of the pinion.

Reverting to the "absurd" proposition of a continuous oil film it may be seen how nearly approach has been made to its realization. It is at once apparent that each roller provides a line of contact with the engaging wheel tooth, so that, instead of one line of contact no tooth, there is a number varying with the depth of gear mesh. Further, each roller has a film of oil over its entire length and circumference, therefore, there is actually that continuous oil film which was previously thought absurd. Not only that, the metal-roller element upon which the film is built is almost as fluid as the oil itself.

Having now completed a brief and rugged analysis of the theory and construction of a pinion designed to fulfil certain requirements, more particularly that of adaptability to varying conditions, there remains to be set forth, in a few words, its application to power transmission and the extent to which it meets those requirements. It may be easily seen that a pinion of this construction is able to accommodate itself to any straight tooth in a wheel, and will continue to do so until the tooth is entirely worn away. It is, therefore, independent of the contour and thickness of the tooth. Also, the tooth may engage with it at any point of its circumference, and it is thus independent of pitch. These facts indicate the elimination of geometrically designed teeth as a necessity, and also, that irregularity of pitch and missing teeth will not interfere with smooth and continuous running. Further, there are no tooth clearances, and therefore no backlash. Other irregularities are provided for in the fact that the rollers are free to incline in either direction across the face. The alignment may be faulty, parts may expand or contract, the foundations may warp and twist, but the little rollers will cling to the teeth of the wheel till it is ready for the scrap heap.

It is, perhaps, at sea with double-reduction gears and turbines that "varying conditions" are most pronounced and in this connection I will at this point introduce some notes of an expert.

Some Notes on Behavior

"In vessels fitted with single-reduction gearing, the teeth should not suffer from the 'shock' forces which break or tend to break propeller blades, as the teeth are sufficiently strong to safely transmit the forces to the turbine; by so doing the speed of the turbine rotors is reduced, or may even cause them to stop or reverse when the forces tending to break the propeller are great. By this action the single-geared turbine acts as a cushion to the teeth, and it is for this reason that there are many successful steamers sailing today with this type of gear. But in the case of the double-reduction geared turbine this would not be the case, as the secondary pinion spindle carries the heavy primary gear wheels, which are virtually fly-wheels humming at between 500 and 600 revolutions per minute—the effect of which is to lock and damage the teeth when the propeller blades are breaking or tending to break.

"As the section at the root of a tooth on the main gear wheel of, say 4 feet 6 inches radius is very small when compared to the section of a propeller blade at 4 feet 6 inches of a 400-feet cargo steamer, and although there is about a three-tooth section in contact, it is only natural to assume that when destructive forces are tending to break the propeller blades the teeth will give way instead. The second-reduction pinion with helical teeth requires a slight fore and aft play, which becomes a fore and aft shooting of pinions and spindle, upon its well-oiled bearings, when the vessel is pitching, rolling, and butting into the waves."

It will be readily understood that the fore and aft shooting of the pinions referred to in these notes might have a very serious effect on the gear, and in the case noted it was so severe that every alternate five teeth in the main wheels were damaged by the impact. This effect was found to have its cause in the use of helical teeth, the pinions being shot to and fro by the action of the inclined planes in motion. This end-play had increased to ⅝ inch in the case cited.

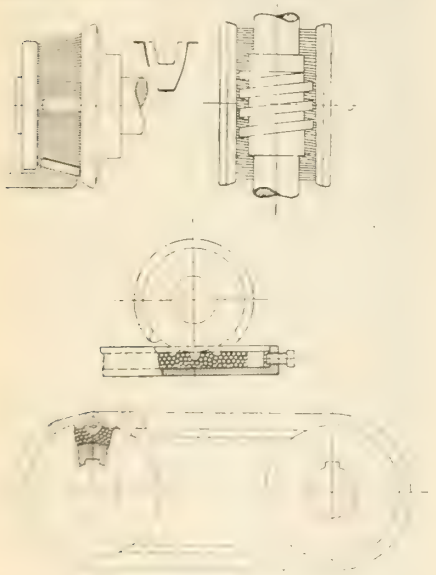
Helical gears were first suggested by Dr. Hook, of Cambridge, with the object of obtaining continuity of engagement and smoothness of action; but, in cases like that cited, these virtues are not necessarily present. From what has been said of the new gear it will be gathered that these objects are expected to be gained with simple straight teeth; it has been claimed that the Autopitch pinion will mesh accurately with any straight tooth of whatever shape or thickness, but there are, no doubt, certain forms which will give better results than others. This presents a problem more difficult to solve than that of the pinion itself. In most of the trials carried out existing wheel patterns have been used, but it is intended to make experiments with teeth of various forms, and to compare results. One important point may be mentioned.

Owing to the adaptable nature of the pinion tooth, clearances are unnecessary, and the periphery of the pinion may be fitted right down to the root of the wheel tooth, thus taking advantage of all the available surface contact.

In cases where existing tooth forms are used, it is neither necessary nor advisable to fit the periphery of the pinion beyond the normal pitch circle. Wheel teeth designed to gear with this pinion should not be more than half the radial length of standard teeth, and may be less. This is a point of some importance, as, assuming the thickness to be the same, the tooth will be correspondingly stronger. It also opens up the question of pitch, but the details are too obvious for inclusion here.

Some Forms of Teeth

Figs. 8 to 20 indicate some possible forms of teeth which may be used with this pinion, but further investigation and experiment will be necessary before the best form is determined. In Fig. 20 the light lines indicate the existing standard tooth and the heavy lines the proposed tooth. The measure of adaptability secured by this new form of gear wheel permits of its being used with bevels, worms, racks, and toothed chains, and several wheels with differing tooth pitches may be driven by one pinion. Figs. 21



Figs. 20 to 24.

to 24 will render a verbal explanation unnecessary in connection with these applications.

In conclusion, a brief review of the requirements for a perfect gear and the extent to which they have been met may now be given.

The first requirement was strength, and in the new pinion there is one almost continuous tooth, composed of hard-steel wires of, say, 14 W. G., the power being transmitted by as many of these as circumstances require. The tooth of the engaging wheel is, say, half the radial length and the same thickness, and is, therefore, four times the strength of a standard tooth. It is to be noted, further, that the load is distributed over the entire surface of the tooth in full gear. So much for strength.

Unlimited durability is, perhaps, too much to ask, but in theory at least it is nearly approached. The only part of the pinion subjected to frictional motion, and therefore to wear, is the rollers. These may not only be of a very lasting material, but their combined superficial area is very considerable, and the wear is distributed over the whole of that area. Further, the rollers may wear a great deal before the mass losses the density necessary to prevent slip. Even then, the slip would appear gradually and could be corrected at the first stoppage of the machine. Without removing the pinion a few new rollers can be dropped into place as easily as dropping oil, and the pinion is thus gradually renewed. The teeth of the engaging wheel will only cease to work when they cease to exist.

The question of adaptability has already been dealt with at some length, and I will only add that experiments have been carried out on wheels with broken and missing teeth, unequally worn teeth, bent shafts, wheels eccentrically and obliquely mounted, and imperfect alignment of parts without disclosing any undesirable effects.

With reference to elasticity, this is covered, for the most part, by the previous requirement, but it may be added that a mass of thin rollers with their continuous film of oil is expected to provide all the elasticity necessary. When the pinion is stationary the rollers settle down into a dead mass, but in motion the radial forces give them life, so to speak, and increase their elasticty as a whole.

Noiselessness is a very desirable quality in gears, and it may be gathered from the nature of the new pinion that any sound caused by it must be different from that of other types. All noise has its origin in vibration, and when one is absent so also is the other. Any of the new pinions which have been fitted make a sound like a stream flowing over a pebbly bed, and it decreases with increase of power.

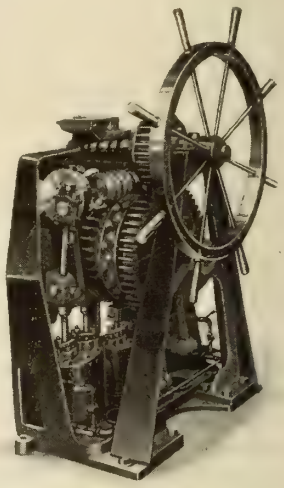
There remains but the question of efficiency or economy of power, and, at the moment, I am unable to give any figures. The pinions in use so far have been fitted for the purpose of surmounting difficulties which had previously seemed insuperable, and have proved entirely successful. In some cases it was required to engage and disengage the gears frequently while the machine was running, and this could not be done by sliding the teeth into mesh. Pinions of the new type may be moved into gear instantaneously or gradually while revolving at any speed. This is done regularly at present at a speed of 2,000 revolutions per minute without shock or danger of any kind. This fact appears to indicate adaptability elasticity, and efficiency.

In bringing this new form of gear to your notice I have attempted to indicate a departure from the beaten track in the realm of power transmission. More than 2,000 years ago Archmedes promulgated a geometrical system upon which has been moulded the mechanical achievements of succeeding ages. The Alexandrian philosophers so broadened the furrows that we can see nothing else. They led us far, and have placed us high in the realm of mechanical science, but if, in the direction of power transmission or anything else, they have led us to a dead end and imperfection, let us strike out on a new path, and, with the accumulated wisdom and experience of the past, make fresh efforts to find the ideal.

COMBINED HAND AND STEAM STEERING GEAR

The steering gear illustrated here, is arranged for small steamers and tug boats, and is so arranged that it can be used either as a hand gear or a steam gear. Owing to its compactness, it can be installed directly in the pilot house of the small vessels it is meant to be used in.

About fifteen seconds are required to



The "Little Giant."

put the helm from hard over to hard over with this gear, and an indicator is furnished which shows at all times the position of the helm. A stop is also installed, which prevents the rudder from jamming. To change from hand to steam gear requires about one minute.

The gear which is named the "Little Giant" is manufactured by the Corbett Foundry & Machine Company Ltd., Owen Sound.

The big marine boiler order received by the Engineering and Machine Works, St Catharines, Ont., will keep the boiler department of the plant going night and day for the next three months. The manager stated his plant was fully manned at present. Signs of improving business are also being shown in other industrial plants in the city and district.

In order to be able to meet the United States competition the charges for the use of Canadian dry docks on the Pacific Coast have been reduced about one third or back to their pre-war level, for the next six months, at the end of which period the question of dry docks charges will have been considered and definitely settled by the Government. The docks at Esquimalt and the floating dry dock at Prince Rupert are affected by this reduction.

The World's Mercantile Shipbuilding

The Summary For The Year 1921 as Compiled by Lloyd's Register of Shipping —For the First Time Since 1913 Figures for Germany Are Given

THE ANNUAL Summary of the Mercantile Shipbuilding of the World, which has just been issued by Lloyd's Register of Shipping, shows that the world's total output during 1921 was 4,341,679 tons, which is a decrease of about 1½ million tons as compared with 1920, but exceeds by over a million tons the output for 1913, which was the pre-war record year for the world. The total figures comprise 167 vessels of about 1,195,000 tons to be fitted with steam turbines; they also include 151 vessels of about 1,050,000 tons built to carry oil in bulk. Of the 1377 vessels launched in the world during the year, 47 are of over 10,000 tons each. During the four years 1918-1921 the total addition to the world's merchant navies by new construction amounts to nearly 23 million tons.

Of the total tonnage launched in the world during 1921, 2,538,680 tons were built under the survey of Lloyd's Register with a view to classification with that Society, and the diagram, included in this Summary, shows that during the last 15 years nearly 29½ million tons of new vessels have been launched which were built under the supervision of Lloyd's Register. The Annual Summary draws special attention to the present circumstances, and to the immediate future, of the shipbuilding industry of the world, and points out that although the tonnage under construction at the end of 1921, viz., 4,457,093 tons, is no less than 2,722,000 tons lower than in December, 1920, even the present reduced figures are not a correct index of the position of the shipbuilding industry unless certain factors be taken into consideration, such as the very large number of vessels, included in the totals, but the construction of which is now suspended, and the fact that the orders for new vessels have been for some time and are now far below those in normal times.

The total gross tonnage of merchant vessels launched in the United Kingdom during 1921 amounts to 1,538,052 tons, of which 964,182 tons are intended for registration in the United Kingdom and 591,870 tons are for owners residing abroad. The totals for 1921 are 517,572 tons less than for 1920, which remains the record year. The total figures include 103 vessels of between 5,000 and 10,000 tons and 24 of over 10,000 tons, the largest being the Laconia of 19,730 tons built by the Cunard Line. Including nearly all the vessels of over 12,000 tons , 70 vessels with a total tonnage of 624,487 tons were launched which will be fitted with steam turbines. The motor vessels launched amounted to 28 of 102,356 tons, the largest being one of about 9,500 tons. The output of the leading shipbuilding districts is as follows:-Glasgow, 358,347 tons; Newcastle, 354,813 tons; Greenock, 146,842 tons; and Sunderland 144,280 tons. The largest decrease during 1921 has taken place on the Clyde, where the tonnage launched is 175,277 tons lower than during 1920; the decrease for the Wear is 170,174 tons and for the Tees 105,013 tons. The total launched abroad during 1921 amounts to 2,803,627 tons, a reduction of just over one million tons as compared with 1920. The countries where the largest output has taken place during the year are:—United States, 1,006,413 tons; Germany, 509,064 tons; Holland, 232,402 tons; Japan, 227,425 tons; France, 210,663 tons; and Italy, 164,748 tons. The totals for the United States are nearly one million and a half tons lower than in 1920. For the first time since 1913 complete figures are available for Germany, and totals for that country include 40 vessels of between 4,000 and 7,000 tons, 13 of between 7,000 and 10,000 tons, and one vessel of about 14,000 tons. The totals for Holland, France, Italy, Denmark and Sweden are the highest on record in each case.

United Kingdom

During the year 1921 there have been launched in the United Kingdom 426 merchant vessels of 1,538,052 tons (viz., 371 steamers of 1,429,757 tons, 28 motor vessels of 102,356 tons and 27 barges of 5,939 tons. These vessels have been built of steel with the exception of three vessels of 1,273 tons and one vessel of reinforced concrete has been launched during the year.

The output for 1921 is 517,572 tons lower than the record figures for 1920, and equals about 35.5 per cent. of the world's output for 1921, as compared with 58 per cent.

Of the tonnage launched during the year, 946,182 tons are for registration in the United Kingdom and 591,870 tons (about 38.5 per cent. of the total tonnage), are for owners residing abroad. The percentage, although slightly lower than that for the previous year, is considerably higher than the pre-war figures which, for the five years 1909-1913, gave an average of 22-1/3 per cent.

Of the tonnage launched in 1921, 134,551 tons are for Norwegian owners, 127,854 tons for French owners, 123,811 tons for Dutch owners, and 66,373 tons for owners in the British Dominions.

Size and Type of Vessels

The returns for 1921 show that 103 vessels of between 5,000 and 10,000 tons each and 24 vessels of 10,000 tons and upwards were launched; the following are the ten largest:—Laconia (19,730), Windsor Castle (19,000), Conte Rosso (18,500), Tuscania (17,250), Moldavia (16,510), Montclare (16,400), Antonia (13,920), Esperance Bay (13,850), Hobson Bay (13,850,) Moreton Bay (13,850).

Excluding vessels of less than 1,000 tons, 38 vessels of about 250,000 tons for the carriage of oil in bulk were launched during 1921. Of these, 27 vessels of about 195,000 tons were built on the Isherwood system of longitudinal framing, besides two other vessels of 14,000 tons. The returns also include a large number of vessels designed for channel, fishing, harbor service, and other special purposes.

The average tonnage of steamers and motor vessels launched in the United Kingdom during 1921 is 3,840 tons; but if those of less than 500 tons be excluded, the average reaches 4,602 tons, compared with 4,387 in 1920, 4,006 in 1919, 4,593 in 1918, 4,993 in 1917, and 4,080 in 1916.

The great increase which was recorded last year in the use of steam turbines has been continued during 1921, when 70 vessels with a total tonnage of 624,487 tons were launched, which will be fitted with this method of propulsion and practically all of them will have geared turbines. It may be stated that all the large vessels mentioned above, and, with the exception of two, all other vessels of 12,000 tons and upwards launched during the year, are to be fitted with turbines. During the year, 28 motor vessels of 102,356 tons have been launched and 11 of them are of 5,000 tons and upwards, the largest being of about 9,500 tons.

Output of Leading Ports

The Glasgow district occupies first place among the shipbuilding centres of the country, showing an output of 358,347 tons. Then follow Newcastle (354,813 tons), Greenock (146,842 tons), Sunderland (144,280 tons), Middlesbrough (129,559 tons), and Belfast (93,373 tons). The largest decrease as compared with 1920 has taken place on the Clyde, the figures for which are 175,277 tons lower than the previous year. The decrease for the Wear is 170,174 tons, and for the Tees 105,013 tons, while in the Barrow district an actual increase of 26,137 tons is recorded.

As regards the movement of the shipbuilding industry during the course of 1921, Lloyd's Register Quarterly Returns show that at the opening of the year 3,708,916 tons were under construction in the United Kingdom, and the March returns showed an increase of about 90,000 tons, the totals reaching 3,798,593 tons. the highest figure ever recorded in the Society's Returns. Since then a steady decrease has taken place, the figures for the end of December, 1921, viz., 2,640,319 tons, being the lowest since June 1919 and showing a reduction of 1,158,274 during a period of only nine months.

But even this great decrease does not entirely represent the actual position of the shipbuilding industry in the United Kingdom. In comparing the present totals with those for normal years account should be taken of the fact that the total returned as under construction at the end of 1921 still includes a number of vessels the completion of which has been indefinitely postponed owing to abnormal causes. Two factors of even much greater importance are, first, that the total also includes over 720,000 tons on which all work is now suspended, and, second, that so very few new orders have recently been received by the shipbuilders. The latter point may be gathered from the December Quarterly Returns which show that during the whole quarter only 55,000 tons of new vessels have been commenced.

Other Countries

Outside the United Kingdom there have been launched during the year 951 merchant vessels of 2,803,627 tons (698 steamers of 2,537,976 tons, 108 motor vessels of 204,286 tons and 145 sailing vessels and barges of 61,365 tons). The figures show a decrease of 1,002,415 tons as compared with those for 1920 and of 2,720,480 tons as compared with 1919, but are 1,402,898 tons higher than those for 1913, the pre-war record year. Taking the output of 1913 at 100, the figures for the last four years are as follows: 1918, 292.6; 1919, 394.4; 1920, 271.7; and 1921, 200.2.

The returns for the year includes 198 vessels of between 4,000 and 7,000 tons each; 96 of between 7,000 and 10,000 tons; and 23 of over 10,000 tons each, including five vessels of over 14,000 tons each, the largest being the Bethore, of 15,300 tons, launched in the United States. Excluding vessels of less than 1,000 tons, the figures for the year include 97 vessels, of a total tonnage of 570,692 tons, to be fitted with turbines, the great majority of which will have geared turbines. Of these vessels 67 are of over 5,000 tons each including eight of between 10,000 and 14,120 tons. The output for the year also comprises 110 steamers of about 810,000 tons built on the Isherwood system of longitudinal framing. Including 92 of these vessels of about 704,000 tons there were launched during the year 113 vessels of about 800,000 tons for the carriage of oil in bulk. Over 86 per cent. of the tonnage built abroad on the Isherwood system were launched in the United States.

During 1921 there were launched 108 vessels of 204,286 tons to be fitted with internal combustion engines. Eighteen of these vessels are of over 5,000 tons each, five in Sweden, three in Denmark and Germany, two each in Holland, Italy and the United States, and one in Norway; the two largest being of 8,681 and 8,654 tons respectively, built in Denmark. The total figures include a number of sailing vessels fitted with auxiliary power. The tonnage of wood vessels included in this year's total is 52,193 tons, as compared with 133,827 tons in 1920, and 1,145,582 tons in the war year 1918 when the tonnage of wood vessels launched amounted to 28 per cent. of the total output. Of vessels built of reinforced concrete, only eight of 7,950 tons were launched during 1921.

The total figures include a large proportion of barges and other craft which cannot be described as real sailing vessels. Apart from such craft there were launched abroad 96 sailing vessels of 29,220 tons, only three of which are of over 1,000 tons, the largest being a five-masted schooner of 2,300 tons, built at Portland, Oregon. The countries where the largest output has taken place during the year under review are the United States, Germany, Holland, Japan, France and Italy. The totals for these countries amount to 2,350,715 tons, and account for nearly 84 per cent. of the total output abroad.

United States

The output for the year 1921, namely, 1,006,413 tons, is 1,469,840 tons lower than during 1920, and over three million tons less as compared with the record year of 1920, The decrease has been general all over the country. The tonnage launched on the Pacific Coast represents 55.7 per cent. of the output for 1920; at Atlantic and Gulf ports about 38 per cent., and on the Great Lakes less than 9 per cent. Notwithstanding this great reduction the figures for 1921 still represent nearly 36 per cent, of the total output abroad.

The total figures for the United States, excluding vessels of less than 1,000 tons, comprise 33 vessels of about 228,000 tons to be fitted with steam turbines, and 11 vessels of about 35,000 tons to be fitted with internal combustion engines. Ninety-two steamers for the carriage of oil in bulk were launched with a tonnage of about 690,000 tons. Eighty-six of these vessels of about 670,000 tons were built on the Isherwood system of longitudinal framing, and in addition nine other vessels of about 76,000 tons were also built on this system.

The totals comprise 53 steamers, each of between 4,000 and 7,000 tons; 50 of between 7,000 and 10,000 tons, and 18 vessels of 10,000 tons and upwards, including the steamship Bethore, of 15,300 tons, launched by the Bethlehem S. B. Corp., at Sparrow's Point, Md., this being, as already mentioned, the largest vessel launched abroad during 1921.

Germany

Figures for this country are published for the first time since 1913. During the year under review 242 vessels of 509,064 tons were launched. As compared with the output for 1913, the present figures are about 44,000 tons higher and represent over 18 per cent. of the total output abroad during 1921. Apart from vessels of less than 1,000 tons, these figures include 17 vessels of 72,777 tons to be fitted with steam turbines and seven vessels of 28,839 tons to be fitted with oil engines. The totals comprise 40 vessels of between 4,000 and 7,000 tons, 13 of between 7,000 and 10,000 tons, and one vessel of about 14,000 tons.

Holland

The total tonnage launched during 1921—232,402 tons—is 49,000 tons higher than the 1920 figures, and is a record. As usual, the figures for this country do not include vessels exclusively intended for river navigation. The total figures, excluding vessels of less than 1,000 tons, comprise 13 vessels, of about 81,000 tons, and also three vessels of about 12,500 tons to be fitted with oil engines. Sixteen vessels of between 4,000 and 7,000 tons each have been launched, and four of between 8,000 and 9,600 tons.

Japan

The output for this country—227,425 tons—is 229,217 tons less than in 1920, a reduction of over 50 per cent. As compared, howover, with pre-war years, the present output still exceeds the combined figures for the four years 1910-13 by over 30,000 tons.

The 1921 totals comprise 21 vessels of between 4,000 and 7,000 tons each, eight of between 7,000 and 10,000 tons each, and two turbine-engined vessels of betwene 10,000 and 10,500 tons each. These figures include five vessels of 43,683 tons, which will be fitted with steam turbines, and three vessels of 21,058 built for carying oil in bulk.

France

The output for the year—210,633 tons—exceeds the totals for 1920 by 117,214 tons (125 per cent.), and is the highest ever reached in this country. The previous record year was 1902 when 192,196 tons were launched; this total, however, included over 146,000 tons of sailing vessels. The total figures include 11 steamers of between 4,000 and 7,000 tons, 11 of between 7,000 and 10,000 tons, and one of 10,741 tons. Eleven vessels of 62,882 tons will be fitted with steam turbines, including two—one of 10,741 tons and one of 4,618 tons—for which turbo-electric propulsion has been adopted.

Scandinavian Countries

The total tonnage launched in Denmark, Norway and Sweden amounts to 194,607 tons, which is 31,260 tons higher than the output for 1920. The increase in Denmark amounts to 16,569

tons, in Norway to 12,603 tons, and in Sweden to 2,088 tons. As regards Denmark and Sweden the present year's figures are the highest on record. The total figures include eight vessels of between 4,000 and 7,000 tons each launched in Sweden, three in Norway and two in Denmark, in which country were also launched three motor vessels of over 7,000 tons each, the two largest of about 8,700 tons each. The tonnage of steel vessels fitted with internal combustion engines launched in Denmark—45,113 tons—is the largest for any country outside the United Kingdom.

Italy

The total figures for this country—164,748 tons—are nearly 32,000 tons higher than those for 1920, and are the highest on record. About 25 per cent. of the total represents the output of the Trieste district. The totals comprise 23 steamers of between 4,000 and 7,000 tons and one vessel of 7,750 tons. Eight vessels of 43,620 tons are to be fitted with steam turbines, and four vessels of 24,512 tons, are built to carry oil in bulk.

British Dominions

The total tonnage launched in all the British Dominions during 1921, namely, 129,675 tons, is about 74,000 tons less than in 1920. The tonnage launched in Canada—78,420 tons—is less than half of the output in 1920. On the coast and on the St. Lawrence were launched 11 steel steamers of between 4,000 and 7,000 tons, and one of 7,177 tons. The tonnage launched in the other British Dominions is 51,255 tons and includes 31,453 tons launched in the Hong Kong district, and 17,408 tons in Australia. The totals for Hong Kong comprise four vessels of between 5,000 and 6,000 tons each.

Spain

During the year 47,256 tons were launched. The figures include two steamers of about 5,000 tons each and two turbine vessels, one of 7,000 and the other of 10,137 tons.

Progress Abroad

A steady decrease has taken place during the whole of 1921 in the work in hand in countries abroad. At the beginning of the year the tonnage under construction amounted to 3,470,862 tons, and at the end of December the total was 1,816,774 tons, a decrease of 1,654,088 tons. Most of this reduction is due to the decrease in the shipbuilding industry in the following countries: the United States (where at the end of December, 1920, there were 1,310,312 tons building, whereas the figures for December, 1921, are 216,428 tons) with a reduction of 1,093,884 tons; Holland with a decrease of 137,085 tons; the British Dominions 120,186 tons, and Japan 103,601.

The only shipbuilding country where the tonnage under construction at the end of 1921 appears from the figures to be considerably larger than that for December, 1920, is Italy, with an increase of about 30,000 tons. The countries abroad having the largest amount of tonnage under construction at the end of 1921 are: Italy, 393,832 tons; France, 362,635 tons; Holland, 313,879 tons; United States of America, 216,428 tons and Japan 144,912 tons.

It should, however, be stated that the above figures referring to work in hand at the end of December, 1921, include a considerable proportion (over 22 per cent. of the total) of tonnage on which all work is now suspended, notably in Italy and the United States. The present condition, and the immediate future of the shipbuilding industry cannot therefore be correctly gauged from the totals of work in hand unless this factor, and others already mentioned when dealing with the United Kingdom output, are taken into consideration.

STATISTICS

Merchant Vessels Launched in the United Kingdom during the two years 1920-1921

District	Steamers No.	Steamers Tons Gr.	Motor Vessels No.	Motor Vessels Tons Gr.	Sail & Barges No.	Sail & Barges Tons Gr.	Total No.	Total Tons Gr.	Total No.	Total Tons.
Aberdeen	12	12,891	..	..	..	..	12	63,891	19	12,403
Newcastle	67	346,439	4	7,619	2	755	73	354,813	83	365,775
Belfast	14	85,917	1	7,456	..	..	15	93,373	23	117,656
Dublin	8	11,525	..	..	..	..	9	11,525	5	8,578
Dundee	9	16,440	1	300	..	..	10	16,740	10	32,797
Clyde:—										
Glasgow	73	303,914	8	53,650	3	783	84	358,347	133	457,032
Greenock	33	142,970	1	3,872	..	..	34	146,842	47	223,434
Hartlepools	6	34,101	..	..	..	..	6	34,101	16	73,221
Hull	15	31,004	1	227	..	..	16	31,231	42	30,588
Leith	9	13,071	1	3,065	..	..	10	17,036	17	36,517
Liverpool	24	50,529	2	451	1	107	27	51,087	34	46,938
Londonderry	2	12,698	..	..	..	..	2	12,698	3	21,053
Middlesbro' Stockton & Whitby	28	129,559	..	..	..	..	28	129,559	44	195,452
Newport (Mon.)	2	9,998	..	..	7	1,369	9	11,367	11	38,560
Barrow, Maryport & Workington	4	42,736	3	20,881	..	..	7	63,617	6	37,480
Southampton	15	19,233	3	948	..	..	18	20,181	16	15,655
Sunderland	30	144,280	..	..	..	..	30	144,280	67	314,454
Other Districts	20	22,452	3	2,987	14	2,925	37	28,364	42	28,022
	371	1,429,757	28	102,356	27	5,939	426	1,538,052	618	2,055,624

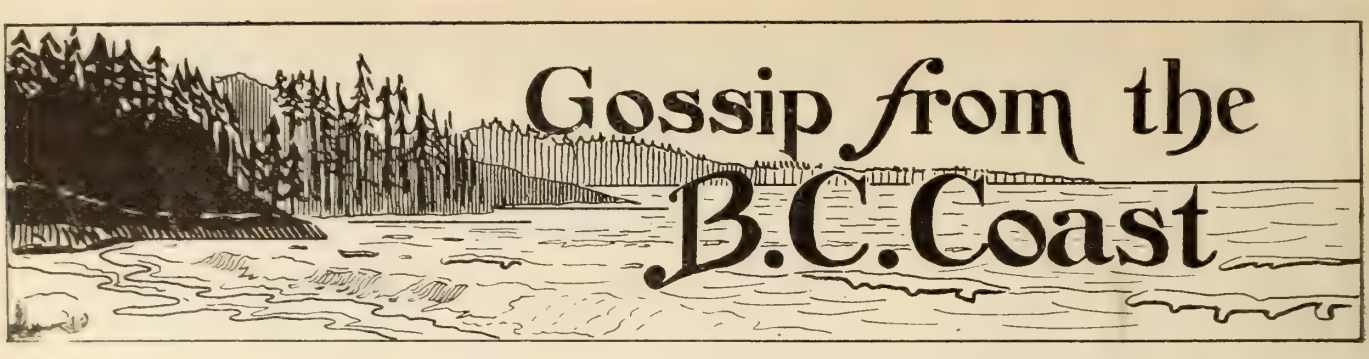
Merchant Vessels Launched Abroad During 1921.

United States— Countries	Steamers Steel No.	Steamers Steel Tons Gr.	Steamers Wood No.	Steamers Wood Tons Gr.	Motor Vessels Steel No.	Motor Vessels Steel Tons Gr.	Motor Vessels Wood No.	Motor Vessels Wood Tons Gr.	Sailing Vessels & Barges Steel No.	Sailing Vessels & Barges Steel Tons Gr.	Sailing Vessels & Barges Wood No.	Sailing Vessels & Barges Wood Tons Gr.
Atlantic Coast	83	591,141	..	..	6	20,693	..	..	12	7,123	8	7,771
Gulf Ports	11	58,355	..	..	..	..	..	..	2	2,000	1	2,190
Pacific Coast	39	292,616	..	..	3	10,940	..	..	..	..	1	2,300
Great Lakes	2	4,084	..	..	5	7,200	..	..	..	..	..	..
British Dominions												
Australia	6	16,918	2	490	..	..	..	..	..	..	..	..
Canada												
Great Lakes	5	11,372	..	..	..	..	..	..	..	..	..	..
Coast	12	63,836	3	820	1	388	1	714	..	..	3	1,290
Hong Kong	10	30,376	..	..	1	167	..	..	2	910	..	..
Others	4	1,749	..	..	..	..	..	..	..	..	4	545
Belgium	3	17,909	..	..	..	..	..	..	..	..	..	..
China	10	26,731	..	..	..	..	..	..	3	600	..	..
Denmark	17	30,859	..	..	13	44,828	1	285	1	200	5	1,066
Finland	4	575	..	641	..	..	4	1,540	..	..	6	1,450
France	57	204,735	..	..	..	..	..	..	7	5,740	1	188
Germany	201	467,443	..	..	22	33,333	..	..	19	8,288	..	..
Holland	86	217,624	..	..	9	13,988	..	..	3	790	..	..
Italy	33	137,427	3	1,322	5	13,561	13	4,754	..	..	31	7,684
Japan	43	227,425	..	..	..	..	..	..	..	..	..	..
Norway	28	39,985	1	351	2	9,930	4	1,192	..	..	..	..
Portugal	..	..	..	..	..	..	7	4,380	..	..	24	7,553
Spain	11	47,256	..	..	..	..	..	..	..	..	..	..
Sweden	13	29,250	..	..	8	34,729	1	530	1	450	4	952
Other Countries	7	12,686	..	..	2	1,134	..	..	..	..	7	2,085
	685	2,534,352	13	3,624	77	190,891	31	13,395	50	26,191	95	35,174

Merchant Vessels Launched From 1892 Onwards.

Year	UNITED KINGDOM Steamers & Motors No.	UNITED KINGDOM Steamers & Motors Tons Gr.	UNITED KINGDOM Sailing Vessels & Barges No.	UNITED KINGDOM Sailing Vessels & Barges Tons Gr.	ABROAD Steamers & Motors No.	ABROAD Steamers & Motors Tons Gr.	ABROAD Sailing Vessels & Barges No.	ABROAD Sailing Vessels & Barges Tons Gr.
1892	512	841,356	169	268,594	147	126,210	223	121,885
1893	438	718,227	98	118,106	135	121,606	175	68,752
1894	549	964,926	65	81,582	148	203,279	170	73,751
1895	526	904,991	53	45,976	190	209,300	111	57,893
1896	628	1,113,831	68	45,920	260	299,421	157	108,710
1897	545	924,382	46	28,104	253	278,443	146	100,995
1898	744	1,363,318	17	4,252	371	415,907	158	109,866
1899	714	1,414,774	12	2,017	292	530,945	251	174,002
1900	664	1,432,600	28	9,871	347	602,989	325	258,703
1901	591	1,501,078	48	23,661	446	800,849	453	291,951
1902	622	1,378,206	72	49,352	487	747,945	469	327,252
1903	632	1,165,503	65	25,115	549	798,205	404	156,808
1904	613	1,171,375	99	33,787	570	626,190	361	156,583
1905	737	1,604,796	58	18,372	525	801,705	256	90,049
1906	815	1,809,433	71	18,910	642	984,613	308	106,807
1907*	752	1,581,521	89	26,369	681	1,070,913	266	99,285
1908	454	914,570	69	15,099	550	791,609	332	112,008
1909	465	972,799	61	18,267	348	564,771	189	46,220
1910	473	1,137,738	27	5,431	453	719,903	324	94,781
1911	700	1,782,908	72	20,936	537	748,615	290	97,781
1912	643	1,720,957	69	17,557	720	1,074,911	287	88,344
1913	641	1,919,578	47	12,575	639	1,269,000	423	131,729
1914	621	1,674,358	35	9,195	473	1,111,027	190	58,173
1915	317	648,629	10	2,290	313	518,948	103	31,771
1916	304	607,907	2	328	506	1,032,074	152	47,771
1917	285	1,162,496	1	400	698	1,669,608	128	105,282
1918	300	1,344,275	1	3,845	1,397	3,996,924	168	102,400
1919	541	1,584,920	71	35,522	1,554	5,203,712	317	320,395
1920	581	2,039,954	37	15,670	982	3,703,030	159	103,012
1921	399	1,532,113	27	5,939	806	2,742,262	145	613,655

*Prior to 1917 vessels of less than 100 tons gross were included if intended to be classed with Lloyd's Register.



THE GRAIN movement from the prairies through British Columbia ports, which has played such an important role in Pacific Coast sea commerce during the last few months, is likely to undergo important changes as a result of the recent stiffening of wheat and flour rates on shipments to the United Kingdom.

Wheat shipments through Vancouver so far this season have totalled about 3,000,000 bushels, and it is expected that a similar quantity is yet to be shipped. Most of the consignments were booked at from 33 to 36 shillings, but within the last few days the figure has jumped above 37 shillings, and it has been known to go over 42 shillings in at least one case. It is the general belief that the increase is due to the desire of the United States Shipping Board to force a conference on the Pacific and Atlantic, and it is probable that a conference will be held early in the spring to eliminate the present close figuring on cargoes and establish a more uniform rate.

The result of the increased rate is that the tramp steamer is likely to have a chance again in these waters after a protracted period of dulness. A big Japanese tramp freighter has been chartered to carry a 7,500 ton cargo to the United Kingdom, although it was impossible to obtain details. The total wheat bookings to date amount to 5,000,000 bushels. The consignments for the Orient amount to 59,200 short tons and for the United Kingdom, 78,600 long tons.

The Vancouver elevator system has been severely taxed and a few days ago a delegation of Vancouver business men went to Ottawa to urge that the facilities be augmented. During the last few months the Pacific Coast has become thoroughly aroused to an appreciation of what this grain business means, and a concerted effort will be made to strengthen British Columbia's position for future development. Prairie grain brokers predict that within a few years two-thirds of the wheat output of Alberta and Saskatchewan will pass through Vancouver for either the Atlantic seaboard and the United Kingdom or the Far East, which has developed into one of the country's most important markets.

The Pacific Coast has several distinct advantages over the Great Lakes route because the winter conditions in British Columbia at no time are severe enough to hamper freight shipments. The harbors are always open—even Prince Rupert, which is, by the way, making an agitation for the establishment of a grain elevator there at the terminus of the Canadian National Railway (G. T. P.). There is an easy gradient over the Canadian National (C. N. R.) to Vancouver and this fact is having its effect on freight rates. A delegation headed by G. G. McGeer, K. C., and Premier John Oliver, is now in Ottawa, fighting for a revision of the freight rates in respect of British Columbia, and if its efforts are successful there is little doubt that rail business to and from British Columbia will be substantially increased. Vancouver has an advantage over Prince Rupert in that it can receive shipments direct from the prairies. Vancouver compares more equally with Fort William in that respect, although Fort William is handicapped by being locked in ice during the winter. A movement is now on foot to have the government piers and elevator at Vancouver placed under joint control so that efforts to build up the grain trade may enjoy the benefits of unification.

Development of the Peace River country in northern British Columbia and Alberta will add to the flow of grain to Vancouver later on and preparations are being made with a view to ultimate accommodation for at least 100,000,000 bushels. The Alberta crop is now about 50,000,000 bushels and the Saskatchewan output averages 200,000,000 bushels. It is believed that all of Alberta's crop and at least half of Saskatchewan's could be advantageously handled through Vancouver. Deducting 25 per cent. of this natural volume to allow for seed and milling there would be 100,000,000 bushels that should flow to the coast.

While in the Federal capital the Pacific Coast delegation will urge that the Government continue the construction of the drydocks at Vancouver and Esquimalt, which were commenced under the Meighen administration, and also the Ballantyne pier in Vancouver. Although no definite report has so far been issued to the effect that these projects would be abandoned by the new government, unofficial advices indicated strongly that such was the intention and numerous protests from Victoria and Vancouver trade bodies have been sent to the government. Now that Hon. J. H. King, Minister of Public Works, has taken office, it is expected that a definite assurance will be forthcoming that the work will go on, as Dr. King is a British Columbian and is thoroughly familiar with local conditions.

Shipping Pool Contemplated

A few weeks ago there appeared to be an atmosphere of hopefulness surrounding the proposal to form a shipping pool on the Pacific Coast to purchase and operate United States Shipping Board vessels out of San Francisco, Seattle, Portland and other ports. Now that the preliminaries are over and a thorough examination made of the conditions that would at once be encountered by the proposed organization, little enthusiasm remains and it appears to be freely admitted that there is no chance of bringing about such a pool, in the near future at any rate. After several days of conference in San Francisco, a deputation of prominent Coast shipping men headed by Herbert Fleischhacker and including such important figures as Captain Robt. Dollar and A. F. Alexander, president of the Pacific Steamship Company, went to Washington to discuss the plan with Chairman Lasker, of the shipping board. The Washington conference lasted two days, at the conclusion of which the deputation departed for the Coast without having reached a definite or even tentative agreement. The general impression is that the main cause of failure was the apparent impossibility of getting the factions representing the various port zones united. The shipping board, too, is hesitant about disposing of its passenger vessels, and Mr. Lasker told the deputation that it might take more than two months to determine the terms on which these ships would be released. The board is waiting to learn what Congress does with American shipping laws and subsidy proposals. In the meantime, Mr. Fleischhacker has appointed an organization committee to harmonize the various port interests, if this can be done. If Congress passes new laws more favorable to American shipping, the shipping board ships will naturally command a better price, and operators will be more anxious to buy them. The Coast deputation held that present laws hampered American shipping and that ships operating under foreign laws possessed an advantage impossible to overcome.

Negotiations are now under way to stabilize freight rates to and from the Orient. Rates are now in such a state that some of the operators are not even making expenses. Operators have been allowing volume of freight to determine the rate and for that reason shippers

have had to rely a good deal on guesswork in finding the cheapest method of transportation.

Lumber Rates Down

Ocean freight rates on lumber cargoes from British Columbia and Puget Sound ports are now virtually open, so far as shipments to the Atlantic seaboard are concerned, and operators are taking what they can get without regard to schedules and agreements with other parties. Some months ago "a gentlemen's agreement" was negotiated setting certain rates that should govern shipments of lumber, but this has now been set aside and is no longer a factor to be observed. Within the last few days rates of $12 a thousand have been offered, which is the lowest on record, with perhaps one exception when the W. R. Grace & Company and American-Hawaiian Company were operating heavily in the intercoastal trade and $11 a thousand ruled for a short time. The result of the slash in rates is seen in the enormous business developed in lumber and shingle shipments from the northwest to the Atlantic seaboard. Against such competition as the water route is offering these days, the railroads are finding it increasingly difficult to obtain a share of eastbound lumber business. Tramps are again active and steam schooners are numerous in the lumber trade between the northwest and California markets.

Shipbuilding and Shipping

Captain M. D. Harbord, president of the Victoria (B. C.) Shipowners, Ltd., will leave shortly for Ottawa to ascertain the attitude of the Federal Government towards a continuance of wooden shipbuilding in Victoria. The Meighen Government put the shipowners on their feet two or three years ago as an unemployment relief measure by advancing $700,000 as a loan for the construction of three wooden barquantines for the lumber trade, a sum of about $300,000 to be raised by the sale of shares locally. The cost of the first vessel, the S. F. Tolmie, which is now engaged in the trans-Pacific trade, was considerably above the estimate and the Government declined to extend all the backing it had originally proposed. This resulted in a general shut-down in the shipbuilding operations. The company is anxious to commence again and hopes to obtain from the government an assurance that the balance of the loan will be made.

British Columbia business interests are urging the Canadian Government Merchant Marine to inaugurate a regular freight service between British Columbia and Mexico and Central America. It is held that Canadian capital is extensively invested in Mexico and that if transportation facilities were satisfactory, big orders would be placed with British Columbia firms. There is a big demand for lumber in Mexico and this could be supplied by Canada as easily as by the United States. The British Columbia Cement Company recently sent a large shipment of cement to Mexico and it is stated that, with regular sailings arranged, important trade development could be brought about. It is also being urged that business with the Fiji Islands should be encouraged. The Canadian Merchant Marine has brought a large shipment of bananas and other tropical fruit from these islands within the last few days, and if these goods find a favorable market here there is a strong likelihood that Fijian fruit may be a big item in future shipments from the Southern Pacific.

The Canadian Robert Dollar Company's steamship Bessie Dollar, while bound for the Orient, encountered a severe storm about 600 miles off Cape Flattery a few days ago, and is now being repaired. The pilot house, bridge and other portions of the superstructure were dislocated and badly battered.

After a year of inactivity the Consolidated Whaling Company, of Victoria, will resume operations this season, and its fleet of whalers is now undergoing overhaul in anticipation of their sailing to the west coast. The first ship will probably go out in April. Last year no whaling was done off the British Columbia coast because of market conditions. The decline in prices as a result of the increasing supply of other kinds of oil made whaling unprofitable and the company's operations were closed down. The market has shown a tendency towards substantial improvement this year.

Shipping in the Far East is paralyzed to a considerable extent as a result of a strike of Chinese seamen for increased pay. There is said to be little chance of an early settlement, and the Canadian Pacific liners Monteagle and Empress of Japan are tied up as part of the idle fleet at Hong Kong. It is stated that 170 ships, most of them British, with an aggregate tonnage of 250,000, are tied up and that both ocean and river traffic are at a standstill. The Empress of Russia will also be tied up in a few days, and the Empress of Asia, which is now bound for the Orient, may be affected by the strike as well, thus tying up practically the whole of the Canadian Pacific ocean fleet.

The inquiry into the Canadian Importer disaster has been concluded, but the mystery of the near-foundering of this steamship is still unsolved. In his finding, Wreck Commissioner J. D. MacPherson strongly reprimands the captain and first officer for the manner in which they gave evidence, declaring that there was a studied reluctance to give the commission the facts of the case, and urged that a new inquiry be held as soon as possible. It is held that the officers of the ship were guilty of negligence by ignoring an elementary precaution by emptying one of the ballast tanks when the ship was already showing a decided list.

An investigation will probably be held in a few days to determine the responsibility for the collision between the C. P. R. steamer Princess Royal and the Pacific Great Eastern tugboat Clinton, resulting in the sinking of the latter at the entrance to Vancouver harbor.

One hundred men are at present working at the Canadian National Railway Shipyard at Hays Cove, Price Rupert. The work going on includes an extensive overhaul of the Grand Trunk Pacific steamer Prince Albert, repairs to eight or ten fishing schooners and the construction of the Francois Lake ferry. The building of the deckhouse and interior fittings of the ferry boat has been commenced, the woodwork on the cradle being completed. The Prince Albert is being generally overhauled and surveyed for re-classification.

PERSONAL

Mr. William Anderson Black, of the well known Halifax shipping firm of Pickford and Black, was elected a director of the Royal Bank of Canada at a recent meeting to fill the vacancy caused by the resignation of Justice T. Sherman Rogers. Mr. Black is a very well known figure in marine circles in the Nova Scotian port, and the province generally.

There has been some talk in the Maritimes of making Mr. Wm. Duff the new Deputy Minister of Marine. Mr. Duff would be a good man for the post, having been actively connected with maritime interests for the best part of his life. It is thought that if Mr. Duff was made Minister, there would then be no need for a special minister of Fisheries. It is felt that a Maritime Province man should be the Deputy, and as there has been a rumour that Mr. Alex. Johnson would return to the British Empire Steel Corporation, Mr. Duff has been singled out to fill his shoes.

Captain J. F. Simmons has been appointed harbour master of the port of Montreal, to fill the vacancy caused by the retirement of Captain Toussaint Bourassa, who has been in the service of the Harbour Commisssioners for the past thirty years. Captain Simmons has been deputy harbour master since the year 1912. His appointment was signalised by occurring on the same day as his marriage, and before taking up his new duties, Captain Simmons and his bride will take a trip to the old country for their honeymoon, lasting about six weeks.

It is announced from Montreal that Captain D. H. Pearson, who was formerly publicity agent of the Canadian Pacific Ocean Services Ltd., and later with the C. P. R. when that company took over the C. P. O. S. has been appointed editor of the British Dominions Trade, a journal devoted to the interests of Empire trade and its development. The close knowledge possessed by Captain Pearson of European and Empire affairs, on which he is a recognised authority will make him a valuable asset to the paper, and ensure his success in his new post.

LLOYD'S REGISTER SHIPBUILDING RETURNS

For the Quarter ended December, 1921

WE PUBLISH below Lloyd's Register shipbuilding returns for the quarter ended Dec. 31, 1921. The merchant tonnage returned as under construction in the United Kingdom at the end of December amounts to 2,640,319 tons. This represents a reduction of about 643,000 tons as compared with the total at the end of the previous quarter, but under the present conditions even these reduced figures cannot be regarded as a true index of the activity of the shipbuilding industry in the near future.

In order to enable a correct comparison to be made between the present figures respecting tonnage under construction and those for normal times, two factors must be taken into consideration, viz., the large number of vessels (totalling over 720,000 tons) included in the present totals although all work on them has now been suspended; also a certain number of vessels the completion of which has been postponed owing to abnormal causes and which, in the ordinary way, would have been off the builders' hands by now and would therefore not have appeared in the present totals. As compared with the figures for the quarter ended Sept. 30, 1921, there has been a considerable increase (viz., 159,000 tons) in the tonnage launched during the past quarter, and for the first time since September, 1920, there is also a slight increase in the tonnage commenced during the quarter.

The total merchant tonnage building abroad is 1,816,774 tons, but this includes about 400,000 tons upon which work has been suspended, leaving about 1,417,000 tons actually under construction. The country where the largest amount of work is suspended is Italy, such tonnage amounting to over 50 per cent. of the total tonnage recorded as under construction in that country. It will be seen that the tonnage building abroad is about 443,000 tons lower than the total building at the end of September, 1921. The decrease affects most countries, but specially the United States of America, in which country the tonnage now under construction is less than 5.2 per cent. of the total building there in March, 1919. The leading countries abroad are: Italy, with 393,382 tons; France, 352,635 tons; Holland, 313,879 tons; United States, 216,428 tons; and Japan, 144,912 tons.

The returns show that there are at the present time 121 steamers and motor-vessels, each of over 1,000 tons, with a total tonnage of 793,193 tons, under construction in the world for the carriage of oil in bulk. Of the total, 82 of 535,019 tons are under construction in the United Kingdom. The tonnage of vessels now building which are to be fitted with internal combustion engines amounts to 368,494 tons. Of the total tonnage given as being under construction in the world—which total excludes vessels the construction of which has not actually been commenced, and also all vessels of less than 100 tons—2,980,937 tons are under the inspection of the Society's Surveyors, with a view to Classification in Lloyd's Register Book.

MERCHANT VESSELS UNDER CONSTRUCTION

The Returns compiled by Lloyd's Register of Shipping, which only take into account vessels of 100 tons gross and upwards the construction of which has actually been commenced, show that there were 515 merchant vessels of 2,640,319 tons gross under construction in the United Kingdom at the close of the quarter ended Dec. 31, 1921. The particulars of the vessels in question are as follows, similar details being given for the preceding quarter for the purpose of comparison:—

Description	Dec. 31, 1921 No.	Dec. 31, 1921 Gross Tons	Sept. 30, 1921 No.	Sept. 30, 1921 Gross Tons
Steam.				
Steel	469	2,448,371	630	3,047,964
[illegible]	..	....	..	....
Wood and Composite	3	1,912	3	1,912
Total	472	2,450,283	633	3,049,876
Motor.				
Steel	36	188,191	49	229,120
[illegible]	..	....	..	....
Wood and Composite	1	205	1	205
Total	37	188,396	50	229,325
Sail.				
Steel	6	1,640	16	3,471
[illegible]	..	....	..	....
Wood and Composite	..	....	1	300
Total	6	1,640	17	3,771
Total Steam, Motor & Sail	515	2,640,319	700	3,282,972

The tonnage now under construction in the United Kingdom is about 643,000 tons less than that which was in hand at the end of September last, and about 1,068,000 tons less than the amount existing 12 months ago.

These figures however do not represent the work actually in progress. The total now returned as under construction includes 722,000 tons on which work has been suspended and a certain number of vessels, the completion of which has been postponed, owing to abnormal causes. These factors should of course be taken into consideration for the purpose of comparison with normal figures respecting tonnage under construction.

Of the merchant vessels being built in the United Kingdom at the end of December, 411 of 2,091,356 tons are under the inspection of the surveyors of Lloyd's Register with a view to classification by this society.

MERCHANT VESSELS UNDER CONSTRUCTION IN THE WORLD

Where Building		No.	Gross Tons
United Kingdom	†	472	2,450,283
	‡	37	18[illegible]
	§	6	1,640
Other Countries	†	445	1,604,138
	‡	93	180,098
	§	73	32,538
Total for the World	†	917	4,054,421
	‡	130	368,494
	§	79	34,178

*Excluding Germany, figures for which Country are not yet available.

† Steam. ‡ Motor. § Sail.

The Tonnage being built in the World at the end of December under the inspection of the Surveyors of Lloyd's Register, excluding vessels the construction of which has not actually been commenced and excluding all vessels of less than 100 tons, amounts to 2,980,937 tons.

WORK IN HAND IN PRINCIPAL DISTRICTS

The following table gives the total figures for vessels now under construction in the principal shipbuilding districts of the country, as compared with those for the previous quarter. Each district of course includes places in the neighborhood of the port after which it is named.

District		Dec. 31, 1921 No.	Dec. 31, 1921 Gross Tonnage	Sept. 30, 1921 No.	Sept. 30, 1921 Gross Tonnage
Aberdeen	*	6	7,795	12	15,420
	†	—	....	..	....
Total		6	7,795	12	15,420
Barrow, Maryport & Workington	*	7	64,166	8	80,793
	†	2	13,986	3	20,667
Total		9	78,152	11	101,460
Belfast	*	31	321,485	40	349,600
	†	..	....	..	....
	‡	..	....	..	....
Total		31	321,485	40	349,600
Clyde—					
Glasgow	*	107	644,724	149	783,827
	†	17	109,185	21	138,585
	‡	3	990	6	1,514
Total		127	754,899	176	923,926
Greenock	*	33	180,515	47	250,264
	†	3	24,300	5	34,972
	‡	..	....	..	....
Total		36	204,815	52	285,236
Dublin	*	3	3,890	8	11,840
Dundee	*	17	57,300	20	61,800
	†	1	7,700	3	8,300
Total		18	65,000	23	70,100
Hartlepool	*	15	67,405	18	89,880
Hull	*	13	49,787	19	60,296
	†	2	357	1	227
Total		15	50,144	20	60,523
Leith	*	6	21,870	10	28,653
	†	..	....	..	....
Total		6	21,870	10	28,653
Liverpool	*	26	92,200	38	111,280
	†	1	120	2	268
	‡	..	....	1	107
Total		27	92,320	41	111,655

Londonderry	*	2	12,000	3	17,800
Middlesbro' Stockton & Whitby	*	24	126,075	36	190,018
	†	2	8,000	..	....
Total		26	134,075	36	190,018
Newcastle	*	81	510,927	97	595,163
	†	2	5,849	4	7,631
	‡	..	....	1	400
Total		83	516,776	102	603,194
Newport, Mon. ..	*	6	13,489	6	18,546
	‡	..	....	..	....
Total		6	13,489	6	18,546
Southampton	*	20	47,929	23	56,679
	†	2	759	5	1,625
	‡	1	250	1	250
Total		23	48,938	29	58,554
Sunderland	*	39	193,305	57	280,936
	†	2	10,340	2	10,340
Total		41	203,645	59	291,276

* Steam † Motor ‡ Sail.

The three tables which follow give further details of the work in United Kingdom yards, the fourth presents statistics of work abroad. It is of interest to note that at the end of December there were under construction abroad 39 steamers and motor vessels of 1,000 tons and above with a total tonnage of 258,174, intended to carry oil in bulk. Of these vessels, 12 of 103,890 tons were building in the United States, 8 of 48,000 tons in Italy, and 7 of 50,200 tons in France.

VESSELS UNDER CONSTRUCTION FOR ABROAD

Country for which intended	No.	tons.
United Kingdom	343	1,911,676
Argentine	5	5,000
British Dominions	17	51,001
Belgium	4	11,260
Chili	3	16,500
Denmark	2	9,850
France	24	141,150
Greece	4	16,220
Holland	16	132,460
Italy	2	37,000
Japan	4	25,200
Norway	21	64,903
Poland	1	1,200
Portugal	—	—
Roumania	—	—
Spain	5	15,960
Sweden	1	5,170
United States	—	—
For Sale or Flag not stated	63	195,769
Total	515	2,640,319†‡

OTHER DETAILS

The following details concerning the shipbuilding work of the United Kingdom during the past three months may be added:—

During Quarter ended Dec. 31, 1921.		No.	Gross Tons.
Vessels commenced	*	17	54,760
	†	1	130
	‡	1	400
Vessels launched	*	90	441,380
	†	7	24,974
	‡	4	892

* Steam † Motor ‡ Sail

SIZE OF VESSELS UNDER CONSTRUCTION

The following table shows the vessels under construction in the United Kingdom classified according to gross tonnage:—

Gross Tonnage			Steam	Motor	Sail
*100 and under	500		38	6	6
500 "	1,000		56	1	—
1,000 "	2,000		57	3	—
2,000 "	3,000		28	3	—
3,000 "	4,000		36	—	—
4,000 "	5,000		23	3	—
5,000 "	6,000		61	3	—
6,000 "	8,000		83	11	
8,000 "	10,000		36	7	
10,000 "	12,000		3		
12,000 "	15,000		21	—	—
15,000 "	20,000		22	—	
20,000 "	25,000		4	—	
25,000 "	30,000		1	—	—
30,000 "	40,000		—	—	—
40,000 tons and above			—		—
Total			472	37	6

*Vessels of less than 100 tons are not included in Lloyd's Register Shipbuilding Returns.

MERCHANT VESSELS UNDER CONSTRUCTION ABROAD

Countries	Steamers and Motor Vessels: Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Sailing Vessels: Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Total No.	Total Gross Tons
America—										
United States: Atlantic Coast	27	181,793	1	250	1	2,000	5	3,255		
United States: Gulf Ports	7	27,680	..	.. ..	..	..	..	..	43	216,428
United States: Pacific Coast	1	1,300	..	.. ..	..	.. ..	..	..		
United States: Great Lakes	1	150	..	.. ..	..	.. ..	..	..		
British Dominions—										
Australia	8	14,800	1	350	..	..	2	3,580		
Canada—Great Lakes	..	....	..	.. ..	..	.. ..	..	..		
Canada—Pacific Coast	5	8,278	..	.. ..	..	..	5	6,100	34	66,469
Hong Kong	8	29,630	..	.. ..	..	.. ..	..	..		
Others	4	3,556	..	.. ..	..	..	1	175		
Belgium	8	25,491	..	.. ..	..	.. ..	..	..	8	25,491
Brazil	1	2,170	..	.. ..	..	.. ..	..	..	1	2,170
China	6	6,050	..	.. ..	..	.. ..	..	..	6	6,050
Denmark	26	62,620	1	450	..	.. ..	..	..	27	63,070
Esthonia	3	1,701	4	790	..	..	13	4,040	20	6,531
Fiume District	7	7,259	2	600	..	.. ..	..	..	9	7,859
France	76	352,635	..	.. ..	..	.. ..	..	..	76	352,635
Greece	..	....	..	.. ..	..	.. ..	..	..	..	....
Holland	123	313,879	..	.. ..	..	.. ..	..	..	123	313,879
Italy	74	377,977	26	9,793	..	..	22	6,062	122	393,832
Japan	35	144,912	..	.. ..	..	.. ..	..	..	35	144,912
Norway	37	60,484	1	600	2	475	..	..	40	61,559
Portugal	..	..	6	3,493	..	..	12	4,190	18	7,683
Spain	15	69,787	..	.. ..	..	..	1	150	16	69,937
Sweden	22	75,078	2	680	2	1,111	7	1,400	33	78,269
Total	494	1,767,225*‡	44	17,006	5	3,586†‡	68	28,952	611	1,816,774

*Including 1 ferro-concrete vessel of 2,000 tons and 3 ferro-concrete vessels of 2,950 tons.
†Including 1 ferro-concrete vessel of 2,000 tons.
The total tonnage building abroad includes 400,000 tons upon which work is now suspended, the country mostly affected being Italy.

NEW CONTRACT FOR COLLINGWOOD

A contract has recently been entered into between The Collingwood Shipbuilding Company, Limited, of Collingwood, Ontario, and the National Sand and Material Company, Limited, of Welland, Ontario, for the construction of a special type steamer for carrying sand and gravel.

The ship is 258 feet over all, 43 feet beam, 20 feet deep, and will have a dead weight carrying capacity of approximately 3,000 tons.

The vessel will be built under the rules of the British Corporation for the Survey and Registry of Shipping and will be class B.S., and will embody all the latest improvements for a ship to suck and carry sand and gravel.

The machinery and boilers are placed aft. The hold is divided into two large hoppers. These hoppers are each 60 ft. long and will carry approximately 2,000 cubic yards of sand and gravel. Between the hoppers is a space 10 ft. long which will contain the hoisting and trawling machinery.

The pump room is built forward of the forward hopper to accommodate two 8 in. centrifugal pumps direct connected to compound condensing engines having cylinders 13 and 26 in. by 14 in. stroke. The 18 in. suction from each of these pumps is direct connected to the shell 5 ft. above the keel and a special feature of this ship is the recessing of the shell plating, accommodating guides down which the outboard suction pipe flange will slide. These suction pipes are portable and are removed when the cargo has been loaded. The pumps discharge the material on to troughs running over the top of the hoppers. The excess water is discharged through specially designed spillways at the end of each hopper.

A special unloading device erected on "A" frames runs the full length of the hopper and accommodates large clam shell buckets. These remove the material from the hold and discharge into a special hopper amidships, the material falling on to an elevator arrangement which passes it up to a conveyor which discharges it on the dock. The space between the main hoppers at the ship's side is divided into several compartments and there is a trimming tank and fore peak tank forward. There is a dry tank under the boilers and water ballast tank under the engine room.

The captain and crew are accommodated forward and the deckhouse aft contains the dining saloon, messroom, galley, engineers, etc., etc.

The vessel is single screw and complete with all necessary auxiliary machinery, including refrigerating plant, electric light plant, special windlass, winches, etc. The main propelling engine is triple expansion surface condensing, cylinders 19, 32 and 56 in. by 36 in. stroke, taking steam from two boilers 14 ft. 7 in. in diameter by 10 ft. 8 in. long, 180 lb. working pressure, natural draft, indicated H.P. 1400.

The vessel will work in the various rivers and is being specially built to supply material for very large contracts, and is the first of her kind to be built in Canada.

Annual Report of the Shipping Federation

NAVIGATION opened with the arrival of the Canadian Government ice-breaker "Lady Grey" on the 29th March, and officially closed on the 14th December, with the departure of the S. S. "George W. Clyde" for Chicago with a cargo of sugar. The first ocean arrival was the Cunard freighter "Venusia" from London, on the 21st April; and the last ocean departure was the S. S. "George R. Growe," on the 8th December.

Volume of Shipping

The total number of arrivals was 964 vessels, representing 2,891,956 registered tons. Of this total 807 vessels with a registered tonnage of 2,598,494 were trans-Atlantic, while 157 ships of 293,462 registered tons were from the Martime Provinces and Newfoundland. These figures show an increase of 301 vessels of 860,227 registered tons over the year 1920.

Heavy Grain Traffic

The outstanding feature of the season's trade was the exceptionally large quantities of grain exported from this port, the total amount of which was 126,289,338 bushels, as per manifests, of which 60,920,043 bushels were carried in regular service steamers and 65,369,295 bushels in tramp vessels.

Produce and Package Cargoes

Exports of produce compared favorably with the previous season, butter, flour and meal showing an increase, while cheese and eggs decreased slightly. Comparative figures for the two years are as follows:

	1921	1920
Cheese (boxes)	1,441,779	1,407,548
Butter (boxes)	70,369	10,357
Eggs (cases)	214,203	271,773
Flour (sacks)	3,326,806	2,439,536
Meal (sacks)	392,207	42,975

Package trade, however, slumped seriously, and had it not been for the large exports of grain, ships would have fared very badly for export cargoes.

Passenger Traffic

Passenger traffic both eastbound and westbound through the ports of Montreal and Quebec showed a falling-off as compared with the previous year, figures being as follows:

Westbound:		
First class	4,426	
Second class	40,174	
Third class	72,381	116,981
Eastbound:		
First class	3,514	
Second class	25,256	
Third class	38,536	67,306
Total		18,287

During the past year the shipping industry experienced a period of depression which has rarely, if ever, been equalled, resultant upon the serious slump in trade and commerce which has affected the entire civilized world. The more immediate cause for the lull in overseas commerce is that countries impoverished by the war have been unable to purchase commodities at the high prices demanded by producers, and the unfavorable state of exchange has resulted in further demoralizing conditions. Yet while the trade of the world has shrunk to smaller dimensions than before the war, the world's aggregate shipping which in 1914 stood at 49,000,000 tons, to-day stands at 62000,000, so that owners necessarily have considerable difficulty in securing remunerative employment for this tonnage. They are face to face with the dilemma that owing to this scarcity of cargoes it is impossible to operate steamers except at a loss; while on the other hand, if vessels are tied up they deteriorate quicker than if kept in commission. Forced sales by auction, not only of single ships, but of whole fleets, have been seen of late, and it is feared that this drastic weeding-out is likely to continue for some months to come. Almost without exception, every round voyage of a large vessel today shows a loss of between £3,000 and £4,000, and with many of them heavily mortgaged the outlook is not reassuring. Present freights would be profitable if working costs were on a pre-war basis; but these costs are still in the neighborhood of 100% higher than before the war.

Shipowners are in the unfortunate position that they cannot create cargoes, but must simply wait for a trade revival before the position can alter materially. In the meantime, all that can be done is to husband our resources and operate vessels still more economically. Gloomy as the prospect seems to be, there is hope that ere long the tide will turn in the direction of prosperity, and this may best be expedited by co-operation of employers and employees.

Hague Rules, 1921:

The Hague Rules, 1921 (which are printed in the body of this report) were adopted by the International Law Association in September, and represent a serious effort on the part of all concerned to come to some common agreement on the much debated question of exceptions in bills of lading.

The International Shipping Conference held in London in November last adopted the following resolution:

"That this conference representative of the shipping industry in every part of the world, which has had before it the 'Hague Rules, 1921,' recently adopted by the International Law Association for submission to the various interests concerned in bills of lading, is of the opinion that the interests of trade and commerce are best served by full freedom of contract, unfettered by State Control. But that in view of the almost unanimous desire manifested by merchants, bankers and underwriters for adoption of the Hague Rules this conference is prepared to recommend them for voluntary international application, and if and so far as may be necessary for adoption by International Convention between the Maritime Countries, Italy and Japan, reserving the right to raise questions on the Rule which prohibits the shipowner fixing a limit of liability below £100 per package.

Canada has the Canadian Water Carriage of Goods Act, and it would be in the interest of all concerned to amend this in favor of the International Rules.

Labor Conditions:

Labor conditions at Canadian ports throughout the year were very satisfactory. At this port, longshoremen, shipliners and checkers accepted reductions in wages about 17 per cent., while for winter season 1921-1922 at the ports of St. John and Halifax, reductions amounting to 21 per cent. and 16 per cent. respectively were effected. It is pleasing to report that throughout these negotiations the most friendly spirit prevailed, and doubtless it was this good feeling that the reductions were accepted without that bitterness which too often is the outcome of such negotiations. There was a plentiful supply of Dock Labor, notwithstanding the increased number of steamers coming to the port, chiefly owing to the fact that steamers loaded full cargoes of grain.

The Act passed by the Federal Government increasing the dues under the Sick Mariners' Act from 1½ to 2c. per ton, came into operation on the 1st January, 1921. This tax, as previously pointed out, is an unjust imposition, discriminating against the Provinces of Quebec, New Brunswick, Nova Scotia, Prince Edward Island and British Columbia, in as much as the tax is not collected on vessels trading to ports in Ontario. There is apparently no necessity for the Government increasing the tax as the official Government returns show that there is now a surplus of $294,996.08 in this fund, and the only two countries in the word levying such a tax are Turkey and Peru. I trust our new Government will take this matter into consideration and reduce the tax to its previous figure of one and a half cents per ton, or, better still, abolish it in its entirety and leave

shipowners to care for their own sick sailors, as they are now required to do under the Shipping Acts.

International Shipping Conference London, England

The Chamber of Shipping of the United Kingdom convened the International Shipping Conference which was held in London, England, on 23, 24 and 25 November, 1921, for the discussion of matters pertaining to the shipping industry throughout the world. Among the subjects then discussed were the Hague Rules, life-saving appliances, carriage of deck loads, load-line, and subdivision of passenger vessels. The conference was attended by representatives of the shipping industry all over the globe, and Canadian interests were represented by Colonel W. I. Gear, whose detailed report will be found attached. Such conferences should tend to bring about more uniformity and co-operation between the respective maritime countries.

International Waterways Navigation And Power Scheme

The International Joint Commission was occupied during the past year in the collection of further evidence for and against proposed waterways and power scheme on the river St. Lawrence west of Montreal. A report was presented by the Engineering Board, consisting of representatives of Canada and of the United States, favoring this scheme, at a cost of $252,000,000, to be borne by the United States and Canada. Mr. Arthur Surveyer, C.E., a noted hydraulic engineer, who has had wide experience with the St. Lawrence waterway and also with the Chicago Drainage Canal, was engaged to make a study of the scheme as put forward by the Engineering Board. His report was unfavorable, and a strongly-worded petition was filed with the International Joint Commission against the adoption of this scheme as being likely to seriously jeopardize the water levels of the St. Lawrence below Montreal.

With the proposed power development which is now planned in conjunction with the navigation scheme, no one can foretell what will be the reaction on the levels of the St. Lawrence below this port. The St. Lawrence waterway is Canada's priceless heritage, and every thing possible should be done to protect and maintain our water levels at any cost.

Colonel Hugh Cooper, a hydraulic engineer of New York, stated in his evidence before the International Joint Commission, that in his opinion the scheme for deepening the St. Lawrence was fraught with such serious engineering problems that he would be in favour of spending $500,000 for further investigation.

Furthermore, Canada with its war debt still but slightly diminished is in no position today to even contemplate the expenditure of hundreds of millions on a scheme of this nature, the commercial value of which has not been demonstrated, and the cost alone must bar the Dominion from becoming involved in this gigantic undertaking. When the time comes for Canada to undertake work of such magnitude, consideration should be given to the Georgian Bay Canal scheme, which has the advantage of being entirely within Canadian territory; while, in addition, the power development derived therefrom would be entirely controlled by Canada and would be quite immune from international control. The Great Lakes-St. Lawrence deep waterway proposal, in my opinion is one not primarily of navigation but of power development.

Chicago Drainage Canal

Judge Landis in the United States Supreme Court issued a permanent injunction recently limiting Chicago from taking more water from Lake Michigan than that fixed by permit from the Secretary of War, which now brings to a close a chapter in a most celebrated case, involving, on the one hand, the City of Chicago, and the navigation interests of the St. Lawrence and the Great Lakes on the other. This suit was brought about to decide whether the State of Illinois, through its power to safeguard the health of its people, could use such methods as would injure the navigable international waters of the Great Lakes and St. Lawrence, of which the Federal Authodities are guardians. The result of this diversion of water has been seriously felt by the shipping interests trading to the St. Lawrence, and it has been proven that the levels of our river have subsided 9.5 inches at low water stage as a result of the illegal action of the Sanitary District of Chicago. Since this Canal was constructed in 1889, the art of sewage disposal has advanced rapidly, and there are undoubtedly further improvements ahead of us, and Chicago should not have much difficulty in the future of protecting the health and property of her citizens without diverting such a large quantity of water from Lake Michigan.

Aids to Navigation

The Naval Service Department without consulting shipping interests, and without issuing the customary "Notice to Mariners," closed down the radio stations at Point Amour, Pointe Riche Cape Ray, Heath Point, Pictou and Three Rivers. That action produced consternation in shipping circles, which was followed up by strong protests. As a result of these representations the Lighthouse Board recommended the re-opening of the stations at Pointe Riche, Point Amour, Heath Point and Three Rivers, but refused to re-open the important station at Cape Ray. Further representations were made without success. Cape Ray is regarded as an important station, being extremely valuable to vessels fitted with D.F. apparatus. It is to be hoped that the Government will see their way to re-open this station next season.

Additional direction finder stations are being urged all along the St. Lawrence coast line. Funds have been voted so far for the erection of one at Belle Isle, but owing to the curtailment of public expenditure, it is very difficult to induce the Government to supply money for the erection of additional stations.

Two stations erected by the Government at Chebucto Head and at Canso (Halifax Harbour) are giving excellent results, and masters are very enthusiastic over the service received from these stations, claiming it is better than any they get from stations on the United States and United Kingdom seaboards. The station at Halifax has been particularly commented on by shipmasters, as this aid to navigation makes it one of the safest and easiest ports to approach in the world, it being possible to come right up the mouth of the harbour under the foggiest conditions with absolute certainty of position.

Pilotage:

Pilotage conditions on the St. Lawrence, especially in the Montreal district, are, unhappily, still unsatisfactory, due to the pooling arrangement which prevails. Furthermore, two cases of refusal on the part of pilots to take out their vessels when called for occurred during the past season, and as a result of representations an investigation was held, and one of the pilots was reprimanded for his conduct. The feeling of those concerned is that the Government should relinquish its control of pilotage on the St. Lawrence and permit shipowners to engage men in whom they have the utmost confidence. This system was adopted by the Government of British Columbia with very good results, and there is no reason why it should not work equally well on the St. Lawrence. It is felt that a system under which every man depended upon his efficiency for employment would work much more satisfactory, not alone for owners, but also for pilots.

Canada's Immigration Policy

Canada will, in the course of the next few years be requiring thousands of immigrants to settle on her land, but by her present policy she is closing the door in their faces. There are many emigrants of good type who are going to Australia simply because of the stringent regulations which make them feel they are not wanted here. What this country wants at the present time is a broad and constructive policy for looking after immigrants, and I hope that the Government will adopt such a policy as will tend to attract the desirable class of immigrants that is being repelled to-day along with the unfit.

Federation Tonnage

Federation tonnage (liner and tramp) amounted to 1,043,313 gross tons compared with 929,307 for season of 1920. Regular line tonnage showed a slight decrease—662,072 compared with 684,408 for year previous. Tramp tonnage, however, showed a considerable increase the total for 1921 being 381,241 compared with 244,899 for 1920, an increase

of 136,342 tons. Canadian registered tonnage entered amounted to 135,740 tons compared with 128,642 tons for the previous year, an increase of 7,098 tons. The following table shows tonnage entered for 1920 and 1921:

	1921	1920
Regular lines	662,072	684,408
Tramp tonnage	381,241	244,899
	1,043,313	929,307

Departmental Relations:

In concluding this report, I wish to state that our relations with the various departments of Government continue to be most amicable, and our thanks are due to the respective officials, all of whom have given courteous attention when we have had occasion to approach them.

I also take this opportunity of thanking the members of the Executive Council for assistance rendered during the past year.

Respectfully submitted
R. W. Reford,
President.

THE SHIPPING FEDERATION OF CANADA

Office Bearers for 1922

R. W. Reford, president; J. R. Binning, treasurer; E. W. Foulds, asst. treasurer.

Executive Council

D. W. Campbell; W. R. Eakin; A. E. Cook; J. R. Binning, treasurer; R. W. Reford, president; E. W. Foulds, asst. treas.; A. Mackenzie; A. M. Irvine; Major P. A. Curry; R. B Teakle.

Sub-Committees

Bill of Lading.—Col. W. I Gear, Major P. A. Curry, J. R. Binning.

Harbour Equipment.—Col. W. I. Gear, Major P. A. Curry.

Manager and Secretary.—Thos. Robb.

List of members present at the Annual General Meeting of the Shipping Federation of Canada (Incorporated), held in the Board Room, 218 Board of Trade Building, Montreal, on February 8, 1922, at 2.30 p.m.

R. W. Reford, president representing The Robert Reford Co. Ltd.

Colonel W. I. Gear, representing The Robert Reford Co., Ltd.

Major P. A. Curry, representing White Star-Dominion Line.

J. R. Binning, treas., representing Furness, Withy & Co., Ltd.

J. W. Nicoll, representing Furness, Withy & Co., Ltd.

Yvon Dupre, representing Sincennes-McNaughton Line, Ltd.

A. A. Larocque, representing Sincennes-McNaughton Line, Ltd.

A. E. Francis, representing McLean, Kennedy, Ltd.

E. W. Fould, asst. treas., representing New Zealand Shipping Co., Ltd.

H. M. Milburne, representing Canadian Government Merchant Marine, Ltd.

C. B. Leaver, representing Imperial Oil, Ltd.

A. Mackenzie, representing Dominion Coal Co., Ltd.

H. H. Stewart, representing Elder, Dempster & Co., Ltd.

T. J. McCaffrey, representing Canada Steamships Lines, Ltd.

Thomas Robb, sec., representing Shipping Federation of Canada, Incorporated.

CANDIDATES SUCCESSFUL IN EXAMINATIONS

The Department of the Naval Service announce that ten (10) candidates were examined during the month of January, 1922, of which the following were successful and obtained certificate of Proficiency in Radiotelegraphy:

1ST CLASS—Commercial

A. Bader, Vancouver, B.C.; S. C. Carpenter, Vancouver, B.C.; H. K. W. McKenzie, Pictou, N.S.; R. M. Semple, Montreal, P.Q.; L. P. Thurber, Wolfville, N.S.

Experimental

W. D. Wood, Vancouver, B.C.

THE SS. "KUTSANG"

The Indo-China Steam Navigation Co., has just increased its fleet by the addition of the "Kutsang" built at the Wallsend Shipyard of Messrs. Swan, Hunter, and Wigham Richardson, Ltd. The ship's name is Chinese and signifies "Increase in Luck." In spite of somewhat boisterous weather, the trials at sea were sucessfully accomplished and a speed of 13.6 knots on a draught of 23½ feet was averaged over a course of 40 knots along the coast off the mouth of the River Tyne. The owners were represented during the trial trip by Captain Lake, their marine superintendent, and by Mr. C. E. Holmes, their superintendent engineer. After the trial runs the ship returned to the River Tyne to prepare for her voyage to Hong Kong under the command of Captain Liddell. The "Kutsang" has an overall length of 454 ft. and is 54 ft. wide and 31 feet deep. She carries 7,800 tons deadweight on a draught of 26 ft. 3 in. and has been built to Lloyd's highest class. On the bridge deck are quarters for the officers and engineers together with commodious state rooms and a handsome dining saloon for first class passengers. On the boat deck is accommodation for the captain and for first class passengers, smoke room and ladies' room. Second class passengers are accommodated in the poop and a hospital and dispensary are placed above the steering gear house. The sailors and firemen have quarters in the forecastle. Refrigerating machinery is installed to keep perishable provisions in good condition. Part of the cellular double bottom of the ship is constructed to carry oil fuel as well as water ballast.

The single screw propelling machinery and boilers have been built by the Wallsend Slipway & Engineering Co., Ltd., the former being of the four crank quadruple expansion type, balanced on the Yarrow Schlick & Tweedy system to reduce vibration to a minimum. The engines are designed to develop about 3,300 I. H. P. under normal conditions in ordinary service. Many special features have been embodied in the engine room to effect an economic and efficient working, and the installation of auxiliary machinery is exceptionally complete. There are four single ended boilers 15½ ft. in diameter with a length of 12 ft. working at a pressure of 220 lbs. per square inch under Howden's forced draught. An installation for burning liquid fuel on the Wallsend-Howden pressure system has been fitted. Two sets of pumping and heating plant are provided, one being as a stand-by in case the other requires overhauling. Settling tanks and observation tanks, together with transfer pumps have been provided, with all fittings necessary for a complete oil burning installation. As the ship will run in tropical waters, special attention has been given to the ventilation of the engine and boiler rooms.

SAN FRANCISCO AND SEATTLE

Captain Robert Dollar, chairman of the special committee on port equalization, which announced a few days ago the absorption by the carriers of the wharfage charge of 15 cents per ton on goods moving in foreign trade over San Francisco docks, to-day (Saturday) issued a statement serving notice on the ship owners of the world that the port of San Francisco now can give them much cheaper service than Seattle. In fact San Francisco has the best managed and most economical harbor in the world, according to Captain Dollar. His statement follows:

"San Francisco in the past has made a customary charge of 15 cents per ton on merchandise both entering and leaving the port. Seattle in order to get the advantage of San Francisco a few months ago abolished their charge for commodities passing over their wharves, and instead it was absorbed by the carriers. By this means freight was diverted from San Francisco to Seattle.

"The San Francisco Chamber of Commerce recently took the matter up and called a meeting of the Harbor Board, steamship owners, and the railroads. At this meeting Captain Dollar was requested to go to Seattle and endeavor to have that port change back to the former plan of making the merchandise pay its share. However, after the meeting of steamship men and railroad officials there who wanted the old system of making the freight pay wharfage, which all considered fair and just, the harbor board refused to make any change.

At a meeting held a few days ago in San Francisco, Captain Dollar reported his failure to get the Seattle Harbor Board back to the old plan. It was therefore decided that the steamship lines and railroads should pay 7½ cents a ton each and allow the merchandise for Oriental ports to enter and leave free of

charge. What Seattle will gain by their arbitrary stand remains to be seen.

"As it stands now, ships will pay in San Francisco 7½ cents tolls (wharfage) and 35 cents for handling, or 43½ cents a ton in all. At Seattle the same service cost the ship 25 cents for wharfage and 40 cents for handling, or a total of 65 cents, being 21½ cents more than San Francisco. Besides this the railroads in Seattle have to pay 21½ cents a ton wharfage against 7½ cents a ton here, making Seattle a very dear port for operators. Shipowners throughout the world sending ships to this Pacific Coast please take notice.

"According to the new arrangement on a ship carrying 10,000 tons of cargo entering Seattle the cost would be greater by $2,150 than at San Francisco and it would cost the railroads to handle this same cargo through Seattle $1,750 more than at San Francisco.

"In addition to this San Francisco's wharves are equipped with railroad tracks on each side. No harbor in the world has better facilities for the rapid and economical handling of cargo and we justly claim that since our harbor has been divorced from politics that we have the best managed and most economical harbor in the world as evidenced by the net profit earned last year of $665,782, against Seattle's deficit of $3,837,000. Surplus is all going into new improvements.

"Furthermore our Belt Railroad only charges $3.50 a car for hauling cars from any railroad and delivering them promptly at any of the wharves or industries located on our fifty-four miles of Belt Line tracks, which charge is absorbed by the railroads, when shipments originate at or are destined to stations served by two or more lines."

LUXURY MOTOR BOATS

A further activity of the above company is noted in the details just published concerning a 52-feet lake cruiser which has been constructed for His Highness the Maharajah of Patiala. For this cruiser no expense has been spared to achieve the maximum of comfort together with a handsome appearance and a high degree of reliability. The vessel will be built of galvanized steel plates butt-jointed with the rivet head finished flush, to produce a clean surface. Practically all the exposed woodwork is of teak, decks fore and aft being of this wood, together with the cabin, steering shelter and hatches. The deck planks are tapered at the bow and stern instead of being laid straight. In the saloon the windows are of the sliding railway pattern fitted with sliding mosquito screens and wooden jalousies. The sliding door at the after end of the steering position gives access to a galley and pantry which is to be provided with an ice chest and a dresser with a sink, a plate warmer, and all other usual accessories. Gun racks are provided aft of the saloon and in a suitable position by the steering wheel as the boat is to be used largely for duck-shooting on Lake Patiala. The decorations, upholstery, curtains, etc., in the saloon are being supplied by Waring and Gillow, and are to be of the very best materials obtainable. All the internal metal work will be either of silver or silver plate, and a full outfit of cutlery, glass, plate, etc., is to be of the finest quality available.

COASTAL MOTOR BOAT

So jealously was the secret guarded by the authorities that it was not until some considerable time after the close of hostilities that the general public had an opportunity of learning something of the remarkable services rendered during the war by that invaluable addition to the British Navy—the fleet of high-speed coastal motor-boats (C. M. B.'s or "scooters") by which name they have now become familiar.

In recalling briefly the record of their achievements, from the penetration of minefields of enemy bases for reconnaissance work and counter mine laying, the hunting out and destruction of submarines, the triumphant exploits during the memorable Zeebrugge raid, to the daring attack on Kronstadt Harbor and the torpedoing of numerous Bolshevik cruisers, some idea may be gained of the extraordinary efficiency and invulnerability of these little vessels, constructed of timber less than half an inch in thickness, armed with two or, in some cases three torpedoes, in addition to depth charges and machine guns, and capable of speeds of over 40 knots.

Considering this list of successes, the subsequent decision of the British Admiralty to adopt this class of boat as a permanent arm of the Service came as no great surprise to those more closely associated with their operations during the war.

That foreign Powers have not been backward in realizing the immense possibilities for these "mosquito craft" is indicated by the announcement of the delivery to the French Navy of a second boat recently completed by John I. Thornycroft & Co., Ltd., who are responsible for the design and construction of these boats, while similar boats will shortly be running trials prior to delivery to the United States Navy Department.

Having regard to the fact that these are probably the first naval contracts to be placed by the United States Government with any firm in this country, or for many years by the French Government, a few particulars illustrating briefly the general characteristics and armament will, no doubt, prove of interest.

As an example may be taken the boat designed for the French Navy, which on her recent trials attained a speed of 41.6 knots, while carrying a load of over 10 tons.

This boat is 55 feet in length with a beam of 11 feet and draft 3 feet 3 inches. The hull is built of two skins of Honduras mahogany, the inner planking being laid diagonally and fastened to elm frames with the outer planking running fore and aft. Oiled canvas is stretched between the two skins to ensure water tightness. A third skin worked in from the fore portion of the boat and extending to amidships, forms a step of about 3½ inches in depth on to which the boat rises as she gathers speed and so obtains a skimming action over the surface of the water. The after construction is such that when traveling at full speed, the boat is supported solely by this step and the stern portion and on a cushion of air formed between these two points.

Despite their light construction and apparent fragility, the safety and seagoing capabilities of these boats in all but the roughest of seas have been conclusively proved; the special construction providing for considerable flexibility and enabling the craft satisfactorily to withstand "pounding" in a heavy swell.

The forward portion of the boat, decked over, is devoted to the machinery space. In this there are fitted 'en echelon," two sets of Thornycroft 12 cylinder engines, each developing 375 h. p. at 1,500-16,000 revolutions.

For starting up, a small auxiliary single cylinder engine of about 2¾ h. p. is provided driving a worm shaft through a clutch which engages the starboard engine. This auxiliary can be utilized independently when required for charging accumulators for electric lighting, etc.

Four hundred gallons of petrol carried in two tanks provide sufficient fuel for a radius of action of about 200 sea miles.

As regards armament, the 55 feet boats are fitted wth two 18 inch torpedoes carried in troughs in the after portion of the boat, two depth charges, and four machine guns.

When in action, the torpedoes are released by means of levers placed close at hand to the navigator, who sights the objective through a torpedo director fitted forward of his position amidships. On being fired, the torpedo slides down the trough, stern first, into the water—the propelling motor being simultaneously started up—and runs forward to the objective; the boat meanwhile turns to port or starboard leaving the track clear.

This operation is carried out with the boat running at any required speed.

Their high speed and quick manœuvring power render the boat a very small objective for enemy shooting and a formidable offensive weapon.

In the many engagements in which they took a prominent part during the war the percentage of casualties was very small.

Their services at the Zeebrugge Raid are dealt with fully in Captain Carpenter's recently published volume "The Blocking of Zeebrugge."

LONG RANGE WIRELESS

During December last, the Marconi Operator on the C. P. R. steamer "Princess Adelaide," on the Ferry run between Vancouver and Victoria, picked up ramarkably clearly a Wireless Telephone speech from a station in New York, which was carrying out tests at that time.

Member of the Audit Bureau of Circulations

Marine Engineering of Canada

FEBRUARY, 1922

A Monthly Journal Dealing with Marine Engineering and Marine Activities Ashore and Afloat.

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Motor Ship Development

THE COMING of the motor ship is evidenced by the statistics given in the summary of shipbuilding for 1921, published in this issue. There were twenty-eight motor vessels of 102,356 tons launched in this time, and eleven of them were over 5,000 tons, the largest being in the neighborhood of ten thousand.

We remember a conversation held a couple of years ago with an engineer of long experience in both marine and mechanical work, who in his time has built and designed a number of engines. He stated at that time that the internal combustion engine for large vessels would not be an accomplished fact for many years, and gave as his reason for so saying, that there would be grave difficulty in insuring them. This he thought was on account of the large number of crank shaft breakages that had taken place. There is no doubt that the development of the internal combustion engine for commercial purposes was attended with difficulty, but the advantages attending its adoption to marine work were so great as to ensure that every effort would be made to ensure success. The increasing number of these vessels would tend to show that there are no mechanical troubles existing to-day to cause any misgivings on the part of shipowners. The very name of the firms adopting the Diesel engine as motive power is a sufficient guarantee of their suitability.

We have seen just recently, a description of a compound Diesel engine, developed by Mr. Elmer Sperry in the United States. This is of course an effort after still higher efficiency. The Still engine in England promises much higher thermal efficiencies than have yet been obtained, but this would seem to be somewhat complicated for commercial use. The great field, of course, lies in the development of the internal combustion turbine, research in which direction is constantly being carried on in different countries.

The present era of dull trade and keen competition is just the setting needed for the stimulation of scientific research into more economical methods of developing power, and it would not be surprising if the year 1922 had something startling to offer on these lines.

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Our Cargo Fleet

THE PROBLEM of what to do with our merchant marine is one that the new government will have to take up in earnest, at the new session of Parliament. The results of the past year's working show that if the fixed charges on capital and depreciation are taken into account, a loss in the neighborhood of $8,000,000 has been suffered. In the present state of the country's finances, burdened as we are with railways which are also showing large deficits, it would seem that a bold course should be taken. The first thing that should be done is to write down the value of the ships to present day prices, which are very far below the values at which the ships stand on the country's books. The market price for that class of vessel is today about $30 per ton, and this is a far cry from the average $200 per ton which the fleet cost. While writing down the value would not increase the operating profit, it would decrease the fixed charges. The amount written off would of course be a dead loss to the country, but that is inevitable. In fact, the country would probably be better off if the whole amount were written off and the ships disposed of to the best advantage.

If Canada were a country that was neglected by the existing shipping firms, and was suffering from that neglect in her trade, there would be a case for the government to go into the shipping business. There is no such need, Canada being well served by a large number of shipping firms, on regular schedules, besides the usual number of tramps that turn up for seasonal requirements. The government in competing with these vessels has to accept the same rates as they do, and cannot underbid them without calling on the taxpayers of the country to make up the difference. As to the use of the ships in developing Canadian trade, we have but little faith in that. The Canadian manufacturer needs something more than shipping facilities to develop export trade, and when the export trade is in existence, there will be no lack of ships to carry it.

The fleet was born in a moment of enthusiasm, without any too careful enquiry into the needs and prospects of success, and the thing to do now is to cut the losses and get out of the shipowning business.

The Canadian government is not alone. A lot of people went into the shipowning business in the last few years who are now out of it, some of them voluntarily, and others by force of circumstance, while there are still others who are making strenuous efforts to become free of their burden.

It will be interesting to see what the government will do towards a solution of this problem.

News of the Shipping World

THE LATEST company to become owners of a motor ship is the Royal Mail Steam Packet Co., for whom the motor ship, "Loch Katrine," is now making her first voyage. She will be on the Panama Canal Northern Pacific route. The vessel which was built by John Brown & Co., Clydebank, is very similar in design to the Glen line motor ships, "Glenogle" and "Glenapp," which have been fully described in these columns in previous issues. She is of 14,000 tons, having a length of 502 feet and a beam of 62 feet. While there is a small amount of passenger accommodation provided, she is essentially a cargo vessel. The machinery consists of two 3,200 I. H. P. eight-cylinder engines, built by Harland & Wolff, of the Burmeister & Wain type. The cylinders of these engines are 750 m. m. diameter and 1,150 m. m. stroke, running at a speed of about 115 r. p. m., which gives her a speed of about 13½ knots when fully loaded. In addition to the main engines, she is furnished with four 100 k. w. generators, each driven by a 150 h. p. three-cylinder Diesel engine. All deck machinery is driven by electric motors, and there is also an electrically driven air compressor which is used for maneuvering purposes only. For heating the cabins and to supply an emergency steam driven air compressor a small donkey boiler is installed. The vessel is a notable example of the new style of ship which is fast becoming general in various trades throughout the world.

* * * *

A COMMITTEE appointed by the Governing Board of the Maritime Association of the Boston Chamber of Commerce, has recently handed in its report on what should have been done in the nature of bringing into force a national shipping policy in the United States. The report is a long one, but the main conclusions may be summarized. Briefly they are as follows:—

The continuous withdrawal of the Shipping Board from vessel-ownership and operation until the fleet in their possession is entirely disposed of. That while this is going on certain trades be kept open by ships under the U. S. flag, these trades including the Trans-North Atlantic, the East coast U. S. A. to East coast South America, and the Trans-North Pacific. The committee suggests that the vessels used in these trades should be of the very highest type, suitable for passenger, mail, express, refrigerated goods and general cargo. They should also be readily convertible into armoured cruisers or transports if need arose. The committee recommends to the President the revision of the navigation laws so as to allow American owners to build or purchase vessels and operate them under conditions that will enable them to compete with ships of other nations.

The Shipping Board to revert to the original purpose for which it was created, and to formulate practical plans for the encouragement of American ownership and operation of vessels, to obtain a fair share of international carriage by sea, as well as coastwise and inland traffics. The committee calls attention to the fact that a large part of the American Merchant Marine consists of wooden and otherwise obsolete vessels and recommends that these be scrapped in the same manner that any other left-over war material would be. Attention is called to the provisions of the Jones Act, and the fact that opinion is divided on the advisability of enforcing this legislation. The committee agrees that the U. S. shipowner cannot exist in competition with foreign ships unless he is given a substantial subsidy by the Government.

It would seem to take a lot of explanation to make our neighbors see that they cannot secure business in competition with other nations when their operating costs are the highest in the world. The sooner they get this fact fixed in their minds the better chance will they have to get their share of marine business. It is of little use claiming that they have the finest sailors and engineers, etc., in the world, and that they have to pay them high wages, when vessels manned by ordinary human beings who do not need feather beds in their bunks, can go out and get the cargo. We doubt very much if the farmer of the middle west and the inland states in general will enthuse very much over paying taxes in order to help the shipowner who cannot help himself.

* * * *

THE INDEX number of shipping freights, supplied by the Chamber of Shipping to the "Statist," shows that the number for December is 33, which compares with 29 for November. This represents an increase of 11.4 per cent. on November and 10 per cent. on October.

The increase is due to the great improvement in rates from the Plate and Brazil, and is therefore partly seasonal in character. That it is not wholly seasonal will be seen by examining the corresponding figures for November and December, 1920, when the Index Number as a whole fell from 80 to 58, and the Index Number for Argentina, Uruguay, etc., fell from 77 to 47 in one month. American freights have not been maintained at the November level, but they are still one point higher than October, at 31. There seems little doubt that a minimum point has been passed, and it may be hoped that the rise in the Index Number of shipping Freights is symptomatic of a general recovery in trade. The Index Number for the whole year 1921 is 37, and differs by less than half a point from the geometrical average of the time charter rates for the same period.

The Time Charter Rate was maintained at 30 for the third month in succession, and is thus three points lower than the Freight Index Number. The fall in retail prices continues to be more rapid than that in wholesale prices. It should be noted that while the Freights and Time Charter Rates refer to averages for the month, the "Labor Gazette" index of retail prices refers to prices on the first of each month.

Wholesale prices, as measured by the Board of Trade index number, have been 64 per cent. of the prices in 1920; and the cost of living as measured by the "Labor Gazette" index number of retail prices, has been 94 per cent. of the average for 1920.

These figures are sufficiently striking, and show that shipping has borne much more than its share of the slump in trade in what is probably the worst year for shipping on record. It is of interest to note, in this connection, that the value of a new ready cargo steamer of about 7,500 deadweight tons carrying capacity was £34 9s. per deadweight ton in March, 1920, and had fallen to £8 per ton by December last.

Taking the year as a whole, freights, whether measured by the index number or by the time-charter rates, have been 37 per cent. of the freights in 1920. As a maritime nation shipping is naturally a very sensitive barometer of the conditions of our overseas trade, and, judging from the 1921 results, the latter has reached a grievous pass. The trouble with shipping is that the tonnage afloat is largely in excess of the pre-war figure, while the world's trade has diminished consid-

erably below the old peace-time level. There are now probably over 55 million tons of serviceable shipping seeking employment, compared with 42 million tons before the war. Our chief export in bulk, and one which at one time provided the principal employment of British tramp tonnage, was coal, but exports have fallen in 1921 to 24,660,522 tons, as against 24,931,853 tons in 1920 and 73,400,118 tons in 1913. Both liner and tramp tonnage have had to cut rates considerably during the year, sometimes accepting unremunerative figures, and, despite the fall in ships' stores, bunkers, insurance and seamen's wages, losses even on cheaply-constructed and efficiently-managed ships have been frequent. The cost of loading and discharging and general port dues requires to be further reduced in 1922 if shipping is to be restored to a healthy condition.

* * * *

THE COMMISSION which was appointed in December, 1920, to determine the most efficient plans for carrying out the recommendations of the Imperial Wireless Telegraphy Committee, have now made their report. They recommend that the transmitting stations in England, Canada, Australia, South Africa, India and Egypt, should be equipped with thermionic valves, but that at East Africa, Hong Kong, and Singapore, arc stations be fitted, with space reserved for the addition of thermionic valves when found convenient. The Commission suggest the erection of a new station near Johannesburg. The thermionic valve sets should be fitted so as to be capable of transmitting continuously at hand speed and at 90 words per minute at full power for receiving at 2,500 miles. It is also recommended that the Marconi Company be invited to tender for a certain part of the equipment.

* * * *

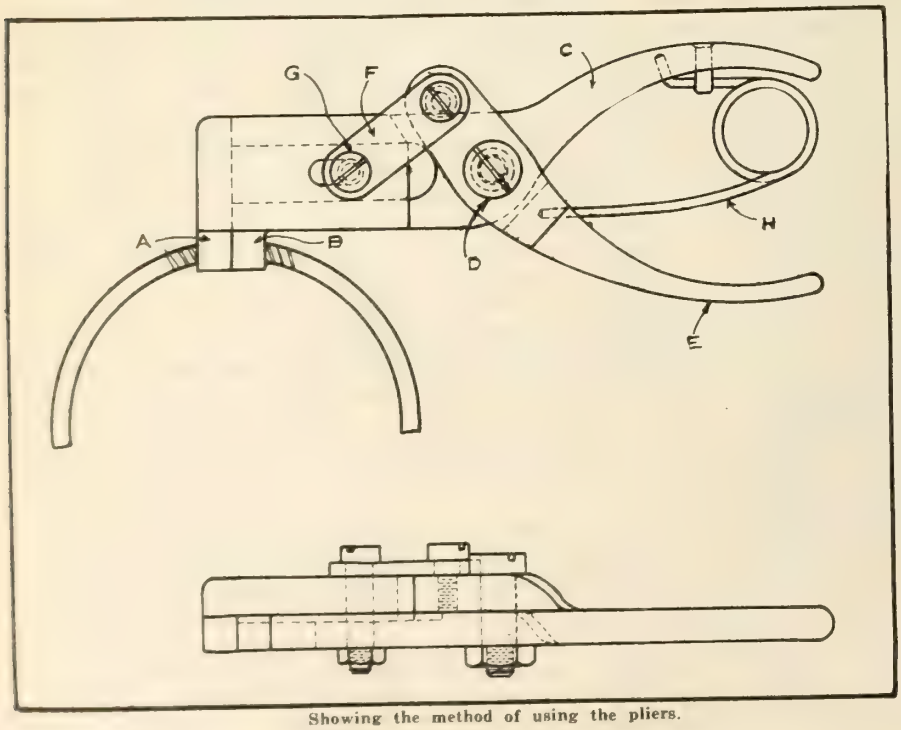
FROM ROTTERDAM comes the news of an unusual piece of towing performed by the Dutch tugboat, "Zwarte Zee," one of the famous fleet of Messrs. L. Smit & Co., Rotterdam. The steamer "Vesta," 1,620 tons, of Flensburg, while on a voyage from Hamburg to Lisbon with a cargo of naphthalene on deck, was set on fire through the spontaneous combustion of this deck cargo. Ten of the crew and the young wife of the chief officer lost their lives, while the remainder of the crew were rescued by the trawler L. T. 1124 of Lowestoft. The burning wreck was left to drift. Soon wireless reports began to come in from vessels which had narrowly averted collision with the derelict, with the result that the "Zwarte Zee" was sent out to search for her. She was discovered still burning about 56 miles west of the New Waterway, and the "Zwarte Zee" set about the highly dangerous task of making a line fast and towing her in. This was successfully accomplished, and the report says that the heat of the vessel's hull was so intense that the water round her hissed and boiled as she was towed into the harbor. The fire burnt itself out shortly after her arrival, having nothing left to feed on, but the whole of the cargo was destroyed, while the vessel herself was completely gutted.

* * * *

THE NEW White Star liner, "Homeric," after completing very satisfactory trials, went round from Hamburg to Southampton, and sailed for New York on her maiden trip on February 15th. The "Homeric," which is a vessel of 35,000 tons, was built for the Norddeutscher Lloyd under the name of the "Columbus," but was surrendered under the peace terms by the German Government, and bought by her present owners from the Reparations Committee. She, together with the "Olympic" and the "Majestic," will be the three White Star liners to carry on the North Atlantic trade for the immediate future.

* * * *

AN EXAMPLE of the power which the Seamen and Stewards' Union wields in Australia is given in the case of the crew of the "Moreton Bay," one of the Commonwealth Government liners. The crew were signed on in England, and at the time were assured that they would be allowed to join the Union when they reached Australia, so that their positions would be secure. However, when they reached the Colonies, the union refused them permission to join them, the result being that they were refused admission to the country on the ground that they were destitute immigrants. The owners of the "Moreton Bay," to wit, the Commonwealth Government, have therefore to carry them back to England as passengers, a somewhat expensive proceeding. In the down-under colonies a trade union has power and authority which it uses in a manner that can be called at least arbitrary.



Showing the method of using the pliers.

TOGGLE ACTION PLIERS

By F. M.

An unusual construction as applied to pliers is shown by the accompanying illustration inasmuch as the action of squeezing the pliers causes the jaws to open parallel with the pliers in such a way that they hold open the spring tempered ring shown in position.

These pliers consist of a pair of jaws A and B, jaw B is in part an extension of handle and frame C, attached to C by means of a pivot screw. D is a handle E, arranged in such a manner as to form a toggle. Operated by E is a link F. This is attached to jaw A by means of a screw G passing through an elongated slot in the frame portion of jaw B. In addition a spring H holds the operative handles apart, thus it is evident that by merely pushing the handles together, through the medium of link F, the jaws A and B are caused to spread apart to perform the desired function of opening the ring.

Scotland's Industry and Trade During 1921

By G. B. JOHNSON
Trade Commissioner at Glasgow

SPEAKING of Scotland's industry and trade in 1921, Trade Commissioner G. B. Johnson says that last year was a disastrous one for the steel trade in Scotland as it was in America. "It is perhaps not generally realized," he continues, "that Scotland is the largest producer of steel of any district in the British Isles. The ingot output of Scotland last year was 2,077,000 long tons. The next in order was the North-East coast of England with 1,958,000 tons, with South Wales and Sheffield following. Scotland has, however, specially cultivated the trade for high-class Siemens steel such as is required for boiler-making, shipbuilding, bridge-building, and general engineering purposes. The Continent, on the other hand, has continued to produce Bessemer quality of steel.

"The steel industry is of such national importance as was perhaps only fully realized during the war when no industry played a more important part. The great demand for war material and the necessity for extensions have enabled the industry to greatly increase its power of production. There are many plants in Scotland to-day which embody all the latest developments, and can compare favorably with any steel plants in the world, although they are not on the gigantic scale of some to be found in the United States and the Continent. The prosperity of the country largely depends upon the steel trade being maintained at the highest standard in all respects, for upon this industry in Scotland and England rests the country's position as the greatest ship owning and shipbuilding nation, as engineers in the building of railways and bridges in this and many other countries, and in the production of machinery.

Foreign Competition

"The year commenced with falling prices and increased foreign competition through falling exchanges. In March the coal strike upset all the calculations of the makers, and plant after plant was closed down as stocks of coal became exhausted, and orders which might have been secured for the West of Scotland were picked up by Continental makers. In August when the strike was well over and coal supplies again available, prices were reduced, boiler plates to £19, ship plates to £14, and sections to £13 10s. per long ton. This action so reduced the difference between Continental and British prices, and Continental makers were so booked up with orders, that a more hopeful feeling prevailed until at a meeting of the Scottish and English Steel Association, it was found impossible to agree to a uniform basis of prices for the two districts. Since that time Scottish producers have been competing with English in the other's territories, and with each other, and some very low quotations have been made. In the export trade, competition from the Continent has been much less severe during the last three months.

Machinery and Engineering

In this branch of industry the past year has followed the course of trade in general. The marine engine section, the most important and in regard to which the Clyde is so pre-eminent, is so closely allied with Clyde shipbuilding, that the fortunes of one tell the tale of the other. There are many other important sections such as the building of locomotives, mining machinery, and machinery for the manufacture of rubber goods, sugar and paper. An important firm who specializes in making rubber and paper machinery recently informed the writer that the year just past was the worst in their long history.

"As far as the shipbuilding industry on the Clyde is concerned, it has suffered a period of stagnation during 1921 from which there seems to be no immediate escape. As one expert says, it has been a year of cleaning off old contracts, and new work has been very slow in coming forward. The general depression has of course, been mainly responsible, with the result that ships have been laid up by the hundred in all parts of the world through lack of demand for cargo space and new ships have not been wanted. Continental competition has also been severely felt, mainly in the departments of repair and overhaul, as their quotations were usually lower.

"It was realized early in the year," continues Mr. Johnson, "that the demand for new ships, apart from other reasons, would not revive until costs of production more nearly approached the market value of ships. Then the attempt to reduce costs, including wages, resulted in numerous strikes, one of which, that of the shipyard joiners, lasted nine months. Whether these strikes opened the eyes of both sides in the dispute to the urgent necessity of introducing good will instead of strife into their mutual relations in order to save their industry, or whether the loss of contracts to the continent and great unemployment demonstrated the necessity of lower costs, it is a fact that there is a new spirit of give-and-take in this industry as well as in others. Wages have been substantially reduced, profits have vanished, the cost of steel is lower, but it is said there is even yet too wide a margin between quotations and the prices which shipping companies can pay and earn dividends.

"The awarding of three of the four super-Hood battle-cruisers to Clyde firms, together with most of the machinery, was a bright spot in the year's gloom; but the position of affairs brought about at the Washington Conference quickly put an end to hopes in that respect. It is perhaps not remarkable especially, but at any rate is worthy of note, that the cancelling of these contracts by the Admiralty was received in such good spirit as was the case. The general relief at the savings to the taxpayers of such large sums as these ships involved easily outweighed any disappointment at the cutting short of local benefits.

"The complete absence of anything in the nature of parochial spirit in the newspapers in this regard was conspicuous. The circulation locally of £30,000,000 of money, which these ships were expected to cost, would have relieved unemployment to a useful extent. But as a gentleman closely concerned with this industry remarked to the writer, the building of the warships was, after all, only an item, although an important item, in Clyde shipbuilding.

Motor Ships

"An interesting feature of the year was launching of nine motor ships. The internal combustion engine has made great headway at sea, as is indicated by the fact that at present there are several hundred ships so equipped. Hitherto this type of engine has not been applied to passenger-carrying ships, but one of the nine above mentioned, and the first of its kind, is the motor passenger liner, the Domala, built for the British India Steam Navigation Company for trade between London and India. This liner can accommodate 140 passengers in addition to 11,000 tons of freight. Her two oil engines develop 4,660 h.p., and her fuel consumption at 13½ knots is estimated to be 20 tons of oil daily. This ship sailed in December from London on her maiden voyage. She is equipped to carry enough oil for the round trip—a decided advantage compared with a coal-burning ship whose bunkers have to be replenished several times on the same journey.

"No immediate improvement in shipbuilding can be discerned, but it should be remembered that building ships is not a basic industry, and any improvement must follow a demand for cargo space, which will come from a trade revival requiring the movement of commodities. The launches on the Clyde in 1921 numbered 408, comprising a tonnage of 512,137 with an indicated horsepower of 493,530."

Marine News From Every Source

Victoria, B. C.:—The court of enquiry into the disaster to the "Canadian Importer" in the Pacific last year, has severely reprimanded the Captain and chief engineer of the vessel, both of whom are held responsible for the accident. Some strong words were used by the wreck commissioner in speaking of the manner in which the evidence of the captain and chief engineer was given. The report says: "It was obvious that that evidence was given reluctantly with an indifference that almost amounted to defiance, but clearly with the studied object of suppressing the real cause of the disaster."

Toronto:—Captain James Young, who had been retired from service for some years, was found dead in his room at 62 Ascor Avenue recently. The deceased gentleman was of advanced years. Death was due to suffocation by gas, one burner of the gas stove being turned on without being lighted. Suicide was indicated by the circumstances.

Collingwood:—The Collingwood Shipbuilding Co., have secured a contract from the National Sand & Material Co. Ltd., for the construction of a sand and gravel carrier with a capacity of about 2200 cubic yards. This vessel will be the largest of her kind on the Great Lakes. Her capacity will be about four times that of the "Baxter Dick" or the "O'Connor Dick" the present vessels of the fleet. It is interesting to note that according to reports, the vessel could have been built in Scotland at a much less cost, but as she will be used on public works contracts, the company felt in view of the prevailing unemployment she should be built in Canada.

London:—It is stated here that the Canadian Government Merchant Marine will shortly establish a monthly service from Canada to the Mediterranean, in spite of the strenuous competition which is being waged by the U. S. Shipping Board. Mr. E. G. Laing has been sent as special representative to Naples, and offices have been opened in Paris, Antwerp, Hamburg and Rotterdam.

Picton:—As a sequel to the sinking of the "Oliver Mowat" with the loss of three lives by the steamer "Keywest," which took place last September, the captain of the latter steamer has been found guilty of negligence and sentenced to jail for twenty-one days. The captain has also had his master's certificate cancelled. He is but twenty-eight years of age.

Sault Ste Marie:—The car ferry Chief Wawatam recently reached Mackinaw City after a trip which included a thirty hour battle with heavy pack ice in the Straits of Mackinac. The straits had been swept by a northwest gale.

Toronto:—It is stated that the "Turbinia" of the Canada Steamship Lines will be put on her old route between Toronto and Hamilton when the season of 1922 opens up. The "Turbinia" has been absent from her accustomed haunts for quite a while, she having been over to Europe during the war.

Ottawa:—The offer of the Royal Mail Steam Packet Co., to provide a service between Canada and the British West Indies every fortnight, in consideration of a 7½ per cent guarantee on the capita cost of the ships to be used, has been refused by the Canadian Government. The Government refused on the grounds of the possible heavy cost. The same kind of service as prevails at present will be continued, the subsidy being $340,666.66 per annum.

Montreal:—It is stated by those in the know that navigation will be late in opening this year. There is much more ice than usual in the river and much less open water. It is not expected to be earlier than April 15th that the official opening will take place.

Toronto:—The Canadian Navigator's Federation held their meeting here early this month, at which nominations for officers for the coming year were received. Ballots will be mailed to the members and the results will be announced at the general meeting to be held early in March. The officers are at present Capt. McIntyre, Collingwood, President. Capt. R. D. Simpson, Owen Sound, Secretary. Capt. F. A. Cook, Treasurer, Toronto.

Washington, D. C.:—In accordance with the convention for safety of life at sea adopted in London in 1914, the U. S. Coast Guard steamer "Seneca" will leave New York some time this month for ice patrol on the Grand Banks of Newfoundland. She will on this duty locate the position of fields and bergs of ice, which might be a danger to vessels in their track.

Port Washington, B.C.:—The Dominion Government have placed a contract with the Vancouver Pile Driving and Contracting Co., Vancouver, for the construction of a wharf on North Pender Island.

Prince Rupert, B. C.:—The Government of the Province of British Columbia have placed a contract with the Prince Rupert Dry Dock Co., for the construction of a ferry, the cost to be $75,000.

New Glasgow:—Mr. George McDougall read an interesting paper before the Cape Breten branch of the Engineering Institute of Canada at their regular meeting on Feb. 11th, the subject being "Shipbuilding." A good number of members were present, and at the conclusion of the meeting a hearty vote of thanks was tendered Mr. McDougall.

Halifax:—Speaking of the rumour that the Halifax Shipyards would be sold M. J. E. McLurg said at Halifax recently "The Halifax Shipyards will not be sold to Henry Ford, the C. P. R. or anybody else. There are no negotiations pending to form the basis for such a rumour. I heard it several weeks ago and do not know from whence it came."

Sault Ste. Marie:—The car ferry "Chief Wawatam" was caught for the third time this season in the ice of the Straits of Mackinac, and rail communication between the upper and lower Michigan peninsulas was interrupted. No discomfort was suffered by the passengers aboard, though no doubt the delay caused inconvenience.

Belleville:—The local Chamber of Commerce are taking steps to interest a Steamboat Company in supplying a service on the Bay of Quinte this season.

Sarnia:—The ferry boat "Louis Philippe," of Montreal, lying in Sarnia Bay, will be used by the Northern Navigation Company as a ferry between Sarnia and Port Huron this season. She will be the first boat of the company's fleet. The Northern Navigation Company are planning to spend in the neighbourhood of $100,000 on the freight sheds at Point Edward to take care of an additional freight contract secured by them, which will amount to 150,000 tons a year, and give employment to about 300 men.

Montreal:—The cancelling of the contract for the new ice breaker which was to be built by the Canadian Vickers Ltd., and the purchase instead of the ice breaker "John D. Hazen," will mean a saving to the Government of over $1,000,000, reports from Montreal state.

GERMAN SHIPPING IN 1921

A Year of Satisfactory Accomplishment

For German maritime shipping last year was a period of development, during which the process of reconstruction initiated in the previous year was steadily continued. The characteristic features of the year were constant additions to the German mercantile tonnage, especially by the repurchase of ex-German ships from the Entente, enormous increases of capital by all the leading navigation companies, and the resumption of services to all parts of the world which had been suspended during the war, while in many instances ships that had been chartered for the purpose of carrying on these resumed services were replaced by German-owned vessels. The leading idea in Hanseatic shipping, says the Hamburges Nachrichtoen, was that it was imperatively necessary to place at the disposal of the country's foreign trade as quickly as possible German steamship lines run by German steamers, as they recognise that in the matter of economic reconstruction foreign trade and shipping are bound together very closely.

In the process of reconstruction of the German mercantile marine, however, many difficulties were encountered. In the first place, the shipping community was badly disappointed by the outcome of the negotiations with the Government on the question of compensation for war losses and the handing over of German merchant ships under the Peace Treaty. The amount of compensation that was agreed upon between the Reich and the representatives of the shipowners was, as will be recalled, only sufficient to rebuild one-third of the pre-war tonnage. But the hopes based merely on that assumption proved to be illusory, because of the sudden and very serious depreciation of the mark, which caused an enormous increase in the price of new tonnage. The instalment of the compensation money allotted for the first year was exhausted in the first few months, and at one time it looked as if the shipbuilding industry would have to come to a standstill or go on short time. As, however, owing to the constant extension of their overseas lines, the German steamship companies were in urgent need of new tonnage, some methods had to be found for achieving the object.

One after another, the leading companies announced new capital issues, and so far did this movement go that during the year 13 companies added a total of no less than 975,500,000 marks to their share capital. In every case the reason given for these increases was the acquisition of new flooring material. In several cases, besides ordering new steamers, certain companies found themselves able to repurchase a number of steamers that had been handed over to the Entente.

Another factor in the process of reconstruction was the so-called concentration movement which consisted in groups of companies working various lines in common for their mutual benefit, thus reducing working expenses very considerably. Successful efforts were also made to interest other branches of German industry, which had been able to make large profits during the war, in the rebuilding of the mercantile marine. Thus arose a close association between Hanseatic shipping and the German iron and steel industry, and to some extent also with the electrical industry. Between various companies whose spheres of operation were almost identical "community of interest" agreements were arranged, with the idea of eliminating wasteful competition and reducing operating expenses. Typical of this movement was the close association of the Africa lines and the working together of the Hamburg-America Line and the Norddeutscher Lloyd in the South American and Far Eastern trades.

Extension of Overseas Service

Thanks to this close co-operation for their mutual benefit the German steamship companies were enabled during 1921 very considerably to extend their overseas services. Thus the Hamburg-America Line and the Norddeutscher Lloyd each introduced a regular service to South America, which they are now working in conjunction with their U. S. associates. Furthermore, the Hugo Stinnes Shipping Company opened a new line to South America, though this action led to a quarrel with the Hapag, with the result that Herr Stinnes was not re-elected to the board of the Hamburg-America Line, while the latter dissolved its connection with the Stinnes concern. The dispute which thus arose has not yet been settled.

In the North American trade the relations between the Hamburg-America Line and the Harriman concern were extended. The Hamburg company was able to exercise its right to introduce its own ships on the North America line, and the service is now being run by an equal number of German and American ships, in accordance with the terms of the original agreement. The North American service of the Norddeutscher Lloyd was affected by the bankruptcy of the Bremen company's U. S. partners, the United States Mail Steamship Company. It is, however, decided to create an independent service of its own to the United States, and this, it is announced, will very shortly be in operation. In connection with the services between Germany and the United States, it may be mentioned—though this matter does not actually belong to last year—that a member of the Roosevelt Steamship Company is reported to be on his way to Germany in order to have a meeting with Herr Hugo Stinnes. But whether the latter is proposing to extend his shipping interests to North America remains for the future to show.

In the traffic to the West Coast of South America the Kosmos Steamship Company extended its services last year, working in conjunction with the Bremen Roland Line. The German-Australian Steamship Company entered into an agreement with a Dutch company for the joint working of its service between the Continent and the Dutch Indies. The Hamburg-America Line and the Norddeutscher Lloyd resumed their services to the Far East, and are working them in close association with the Bucknall Steamship Company. This means a renewal of the so-called East Asiatic Conference.

Very considerable also was the extension during last year of the German services to Africa, in which the Woermann Line, the German East Africa Line, the Hamburg-America Line (Africa service), and the Hamburg-Bremen Africa Line are participators. On the various lines to the Cape run by these companies four steamers per month are despatched.

Thus German shipping can look back to a year of satisfactory accomplishment in the face of numerous difficulties, and, to quote the observation that is made in various shipping journals it begins the year 1922 "in a difficult but not altogether hopeless position."

The following figures have been courteously supplied by the Dominion Bureau of Commerce of Ottawa. These figures represent quantities exported during the 12 months ending January 1921.

Aluminum, Ingots, etc..	176,774 Cwt.
Asbestos, ...	188,792 Tons
Brass and old scrap	32,274 Cwt.
Nickel	572,437 Cwt.
Silver	12,120,433 Ozs.
Printing paper	15,233,214 Cwt.

The following represents the total amount of metals, etc. exported.

Copper	$15,343,864
Gold	3,500,511
Iron and Steel	16,593,108

The rubber export for the same period shows $12,556,915.

Five hundred American manufacturers built or leased plants in Canada during the past five years at a total investment of $150,000,000. Up to date Canada has 14 passenger cars and 13 motor manufacturers.

Seeing that Canada has only .5% of the world's population it is very interesting to note the following figures.

Canada produces 90% of the world's Cobalt, 88% of its Asbestos, 85% of its Nickel, 32% of its Pulp Wood, 20% of its Lumber, 20% of its Cured Fish, 18% of its Oats, 15% of its Potatoes, 12% of its Silver, 11½% of its Wheat, 11% of its Barley, and 4% of its Gold.

It is very interesting to note that the census of the decade ending 1911 shows an increase of 1,835,328 population in the Dominion of Canada. Considering the census taken of the decade ending 1891 the increase only showed 508,429. It is expected that the difference between the increases of the two decades will be twice the number of the former increase.

Cutting a 3 in. Keyway in a 16½ ft. Propeller

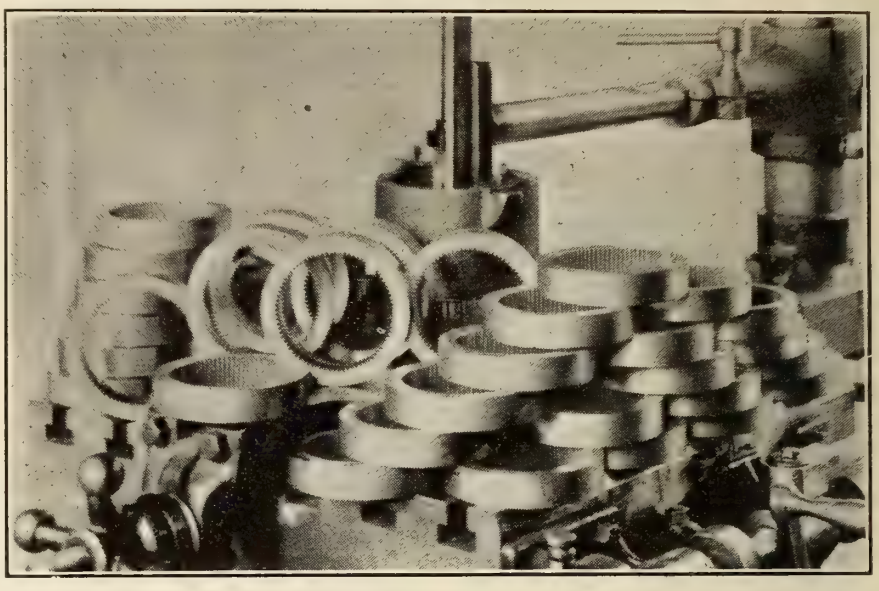
The Modern Keyseater Has Many Refinements—Quick Holding Fixtures are Big Asset—Rotary Tables Help to Speed up Work—Various Examples of Parts Completed on Keyseater

By J. H. MOORE

PERHAPS one of the most misunstood machines existent at the present time is the keyseater. Like the hack saw, the keyseating machine has shown wonderful development within the past twenty years. Who would think of comparing an up-to-date rapid cutting metal saw, with the old fashioned frame that slowly and methodically almost rubbed its way through a steel bar?

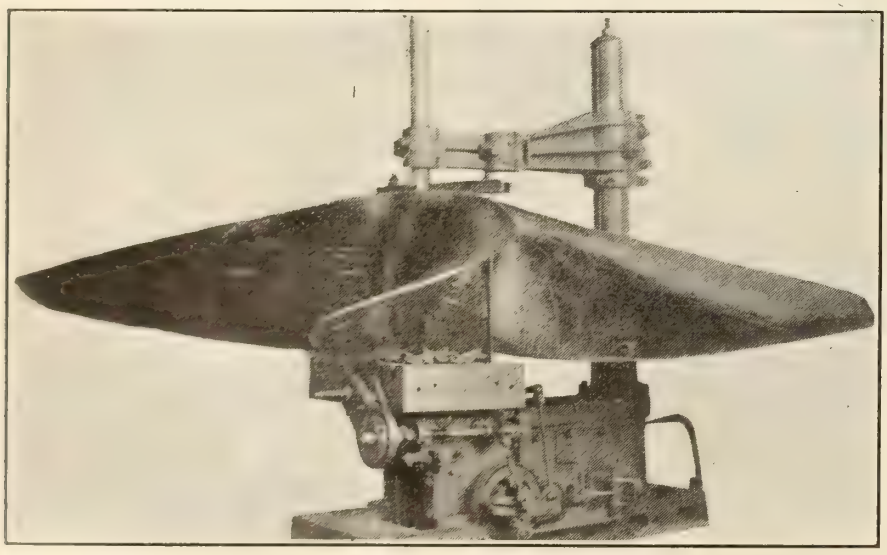
Of course such a comparison would be ridiculous, and to speak of the modern keyseater as a tool to be used on rare occasions only, is likewise out of all reason. From a small, light constructed, and sometimes inaccurate machine, the keyseater has now reached the point where it can be classed as a production tool. In many plants, batteries of such machines are busy all day long on various work that twenty years ago would have been considered too good to trust to a mere keyseating machine. In other words they have proved their usefulness and adaptability to modern production methods. Through the courtesy of certain manufacturers of such tools we are able to reproduce several jobs which have been successfully completed in manufacturing plants on keyseating machines.

To enumerate all the various types existent would serve no special purpose, and to go into the question of design would be likewise futile. Various makers claim certain features for their particular product, but in all cases the principle is the same, (i.e.) to pass a cutter through the piece, thus cutting a keyway, or special shaped slot. When special shaped slots are to be cut, it merely means the making of duplicate shaped cutters, which are placed in the standard bar, or if the work is of very intricate shape, a special bar may be used. In any case it does not interfere with the production of the machine itself.



As a general rule, the modern keyseater is equipped with some type of feed which relieves the cutter on the backward stroke, and which may be set to cut the keyway to any desired depth. Once having been set, the machine is started and will cut any number of keyways alike without further adjustment. Where the keyway is very small, or where there are only one or two pieces completed at a time, the hand method of feeding is usually found to be quite sufficient.

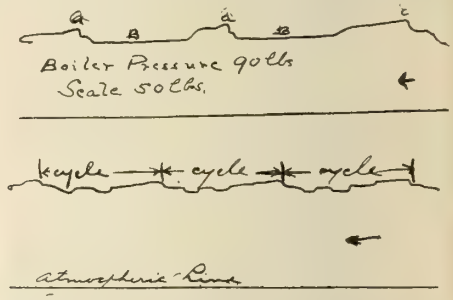
*Photographs through courtesy of Baker Bros., Toledo, Ohio, and Morton Mfg. Co., Muskegon Heights, Mich.



STEAM PRESSURE BOILER FEED PUMPS

By R. McLAREN

"In boiler-feed pumps the steam pressure available and the pressure pumped against are practically equal, so that it might be expected that the area of the steam piston would be made about 40 per cent. larger than the area of the water piston. In actual practice it is found, however, that pump manufacturers prefer to make the steam piston about three times the area of the water piston in very small pumps and about twice the area of the water piston in large pumps. The steam piston of boiler-feed pumps is made so largely in excess of what it really needs to be merely as a matter of safety; its large size simply tends to insure a prompt starting of the pump under almost all conditions likely to arise in practice."



Indicator diagram from pump steam chest.

With the above in mind I was curious to know what pressure there would be in the steam chest and therefore throughout the entire stroke of a duplex, direct acting, outside packed plunger pump whose steam piston is 7½ inch in diameter, water plunger 4½ inch in diameter and stroke 10 inch.

The pump is controlled by a pump governor of a type designed to maintain a constant pressure in the feed line. An indicator was attached to the steam chest cover and by drawing the cord out slowly and steadily while pressing the pencil to the paper, a chart was obtained showing the pressure in the chest over a period covering several cycles. A 50 lb. spring was used and it will be seen that at no point was the pressure up to 50 lbs. in the chest although it was close to it. Fig. 1 is the chart. The boiler pressure was 90 lbs. and the pressure in the feed line 110 lbs.

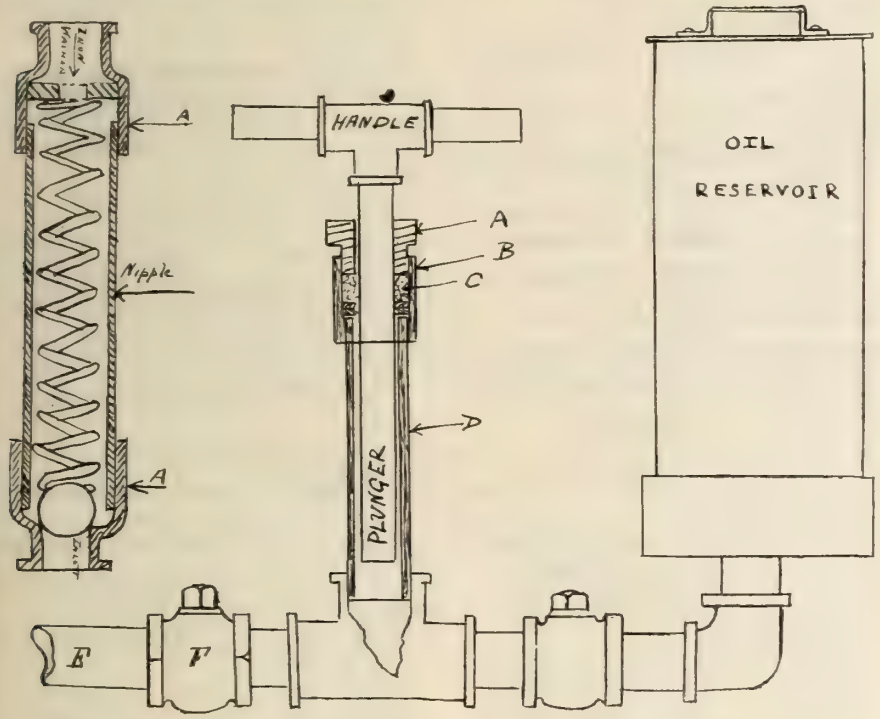
With the throttle closed so that the pump would move very slowly, Fig 2 was obtained.

The governor was not by-passed, the steam having to pass through the governor and the partly closed throttle. At the points a a a the speed accelerated. At points B B the pump was apparently stuck. Can anyone explain why the pressure did not rise at points B when the pump was not moving?

HOME MADE FORCE HAND OR POWER OIL PUMPS

By JAMES E. NOBLE

A friend wanted a one quart size oil pump and upon inquiry he discovered the price to be from $9.00 upwards. The man who paid him his salary refused to invest this amount so the friend collected some pipe fittings and put them together in the shape shown in the sketch. I will not give any dimensions as the pump can be made any size with a ¼ inch plunger upwards. A



General arrangement of pump. Detail of spring and ball valve at side.

is a bushing, B is a coupling, C is packing, under the packing are shown two iron or other metal washers, they prevent the packing working down into the cylinder D, which is a piece of plain iron pipe, it does not require a finished inner surface as the plunger is a very loose fit, the iron rod plunger should be made as smooth and true as possible on account of the tight joint necessary at the packing.

F and G are check valves. E is the discharge. The oil reservoir can be tin or galvanized sheet iron. The sketch shows a piece of large pipe with a bottom cap tapped to take the nipple, an ordinary tin cover on the tap.

As shown it is hand operated but the tee can be removed and a proper attachment used if it is desired to operate it by power. The reservoir can be set up on a shelf if the user would rather have it there, if the conditions are such that the oil will not flow out of the reservoir by gravity when the oiled machines are not operating.

Oil can be prevented from running from the reservoirs by gravity by adding a cut off valve between check valve G and the elbow, or a spring loaded valve can be used instead of check valve F. It is not difficult to make such a valve. Fig. 2 will give an idea for a home made one. A being reducing couplings, B. an iron or brass washer to hold the end of the spring, C the closing valve, consisting of a round ball, a nipple is between the couplings, a long thread being on the ball end. The inlet of course is at the ball end.

The following information has been secured from the Bureau of Canadian information which is connected with the Canadian Pacific Railway Company. These figures wll prove very interesting to those who are not aware of the many points of advantage in Canada. Canada has 300,000,000 acres agricultural land, only 1-6 under crop. Canada has 1,000,000 choice farms awaiting settlers. Canada has only 2 coal regions on the seacoast in North America and controls 1-5 of the world's coal resources. Canada's farming industry has increased twelvefold in thirty years from $14,000,000 to $173,000,000. Canada's forests are estimated to contain eight hundred billion feet of commercial timber and one millon cords of pulp wood. Canada has most expensive fishing grounds—5000 miles on the Atlantic, 7,000 miles on the Pacific and 220,000 square miles fresh water. Canada has over 38,000 miles of railway, or one mile for every 224 persons. Canada has water power equal to 22,000,000 horse power; 90% is still running to waste. There are 686 foundries now in operation. These figures take in Iron, Steel, Brass and Aluminum foundries.

The total number of company incorporations with Dominion charters in 1920 was 991 with a total capitalization of $603,210,850, the greater part of which, without doubt, represents foreign capital. Just how investment in Canada is increasing can be realized from a comparison with the previous year's figures, when there was a total of 512 companies which received Federal charters capitalized at $214,326,000. In addition to the figures above recorded 88 companies, by supplementary letters patent increased their capital stock by $85,187,750. In considering these figures, too, it should be borne in mind that no account is taken of the host of companies incorporated under the charters of the various provinces, all of which have power to grant charters.

OBITUARY

The Port Warden of Montreal, Captain James Nunn Bales, died in that city on January 26th last, in his sixty-eighth year. The deceased gentleman, who had spent thirty years of his life at sea, was appointed deputy port warden of Montreal in 1900, and on the death of Captain Reid was appointed Port Warden.

He was born in Liverpool, and sailed out of that port for a good many years, serving his apprenticeship in sail, and later going into steam He was a resident of Montreal for twenty-two years. He is survived by his widow and two sons, and two young daughters. Captain Bales was an elder of Erskine Presbyterian church, a member of the Royal Victoria Lodge, A. F. & A. M. and a member of the Montreal Board of Trade. He was also a curler, being a member of the St. Lawrence Club.

Mr. George McKenzie, who was from 1873 to 1903 engaged as purser on the steamboats owned by the Folgers of Kingston, died in that city on Feb. 2 last. He retired in 1903 and has been living privately ever since. Mr. McKenzie came to Canada with his parents in 1846, and from 1860 to 1873 conducted the Anglo-American Hotel on Ontario Street, Kingston. He is survived by his widow and one daughter.

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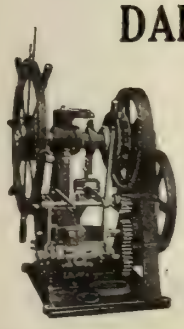

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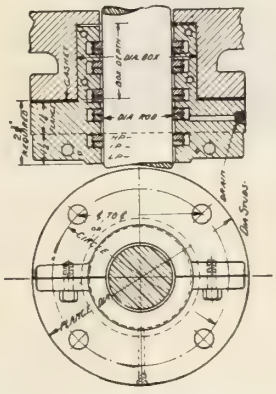

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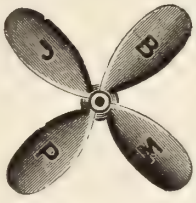

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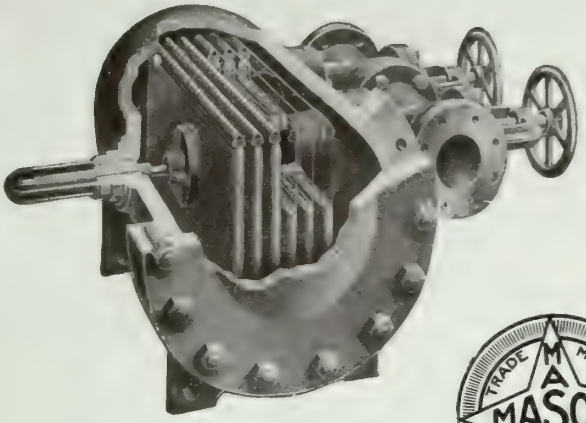

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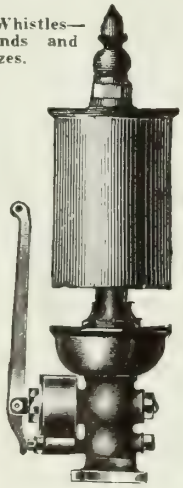

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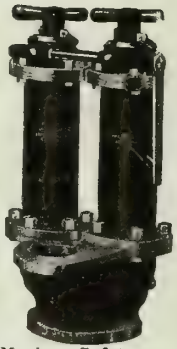

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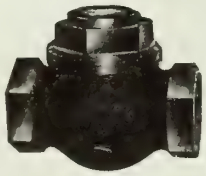

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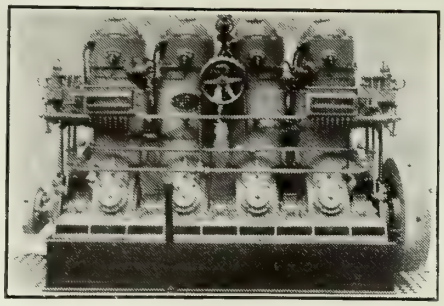

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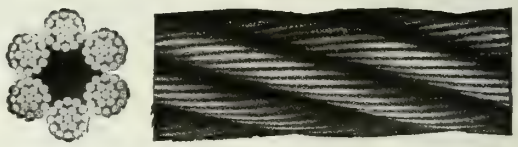

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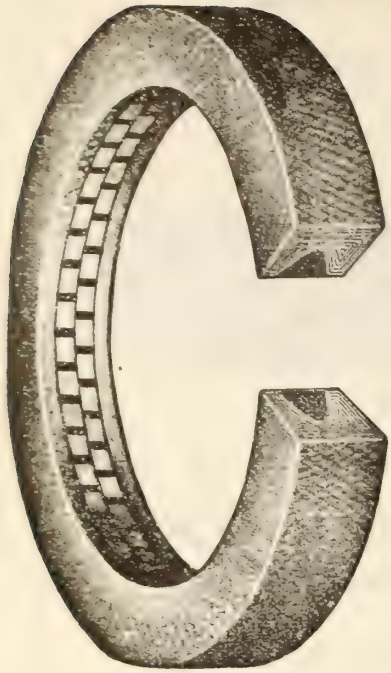

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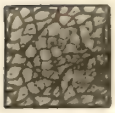

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CANADIAN SHIPPING and MARINE ENGINEERING NEWS

A monthly review of shipping and maritime matters in Canada and abroad. Published by The MacLean Publishing Company, Limited.

Announcement

WITH THIS issue the name of our journal has been changed, to bring it more in line with the policy adopted in our editorial pages. That policy is to give, month by month, a review of the shipping activities of the country, together with the progress of the harbor facilities, shipbuilding, and ship repairing industries in the principal ports of the country. In placing the name "Canadian Shipping" in the forefront, we are only recognizing that at the present time, and for a long time to come, the shipping activities of the country will be greater than the shipbuilding. The marine engineering end, which in its broad sense may include all the shipbuilding and ship repairing industry, will always be complementary to the shipping industry, and will grow with it. "Canadian Shipping and Marine Engineering News," will serve the interests of the people of Canada who are connected directly or indirectly with shipping or shipbuilding.

Under its old name, this journal performed valuable service for the then active industry of shipbuilding. Its detailed descriptions of the various yards throughout the country were eagerly read all over Canada and in Great Britain and the United States. This was particularly so in England, where one of the leading shipping newspapers paid us the compliment of reprinting all the articles on the yards of the Great Lakes and Atlantic coast, contained in our special issues. The journal referred to was the Liverpool Journal of Commerce.

There is a steadily growing shipowning and operating industry in Canada, which will grow stronger as the country grows in population and wealth. The ports of Montreal, Quebec, Halifax and St. John, in the east, and Vancouver and Victoria, Prince Rupert and Esquimault in the west, are expanding with each season, and handling greater volumes of traffic year by year. The St. Lawrence bears the liners of the Canadian Pacific Steamships and the Canadian Government Merchant Marine, the Cunard Line, the Donaldson Line, the White Star-Dominion Line, the Elder Dempster Line, and the usual number of tramps in proportion that find their way up at certain seasons. From our Western ports the ships of the C. P. S., the Alfred Holt line, better known as the Blue Funnel line, keep open communication with the Orient and the Antipodes, and a service is also maintained by the Canadian Government Merchant Marine, to the far east, through the Panama Canal to Great Britain and European ports, and a service is contemplated to Mexico. From Halifax a service is maintained to the British West Indies, besides the various liner calls from European ports, and in winter the activities are increased. Halifax is the natural haven for the east coast that a disabled ship makes for, and is provided with adequate repair facilities to enable them to be patched up and on their voyage again in the least possible time.

Besides our overseas trade, there are the immense activities of the Great Lakes which start in April or May and continue till the end of the year. This opening up of the Great Lakes navigation brings into employment thousands of men who have been doing odd jobs, or no jobs at all for three or four months, and the circulation of their earnings is radiated over a very wide field, reaching those who have little idea that the opening of navigation has anything to do with their increased prosperity, except in a vague sort of way. There is an immense amount of business connected with the mere touching of a ship at a port, and when the ship not merely touches, but discharges and loads cargo, and the one ship is multiplied by hundreds, the life of that port is affected in enormous measure.

Anyone who has passed along the wharves of Montreal or Quebec, or even Toronto, in the winter season, and again in the months when navigation is open, will have had a wonderful object lesson in the benefit of shipping to a community. We feel that the shipping activities of the Dominion have reached a stage wherein a sufficient portion of the population are interested to warrant the publishing of a journal exclusively devoted to ship-owning and ship-supplying, chartering, building and repairing.

We have secured correspondents in some of the principal ports, and will add to our staff as opportunity occurs. We hope to make "Canadian Shipping and Marine Engineering News" a familiar paper on the desk of every shipping office, brokers' and insurance men's offices, as well as in every engineering shop and ship-building and repair yard throughout the Dominion of Canada.

The Growth of The Shipping Interests

The Number of Ships and Liner Companies Trading on Regular Schedules to and From Canada Has Seen Great Increases in the Past Few Years

By T. H. FENNER

LOOKING over the list of companies which are being allotted wharfage space at the port of Montreal for the coming season, and then, going to the other end of the Dominion, and observing the list of sailings from Vancouver in a month, one is inevitably drawn to ponder over the growth of the shipping interests of Canada.

Early Days

The writer's memory carries him back to early days in Liverpool, when the sailings of the old Dominion Line, Beaver Line, and Allan Line constituted about all the shipping services there were between Canada and the old country. This was before the days when the C. P. R. went into the steamship business, or at least in the passenger business. When the writer first visited the port of Montreal, in the fall of 1906, the impression received was but a poor one after seeing such ports as Antwerp, Melbourne, Buenos Ayres, Hamburg, Bremen, Liverpool, London and some others. Sixteen years has made a wonderful change in the port facilities of the biggest Canadian port, and a wonderful change in the amount of shipping using this and the other eastern Canada ports, as well as Vancouver.

The list of big steamship lines making regular sailing to and from the port of Montreal during the season is an imposing one. The names represented in it are known the world over, and the types of ships they are using are of the very best. They are for the most part, vessels that have been built for this Canadian trade, replacing others lost during the war or become obsolete.

500,000 Tons of C. P. S.

The Canadian Pacific Steamships, which now own a total of 500,000 tons of shipping, 130,000 of which have been added in the past year, is one of the principal, if not the principal company. The Cunard Line comes to the fore with five new steamers on the route this season. The Anchor-Donaldson Line, also with new tonnage is another. The Thompson Line, Elder Dempster Line, Head Line, New Zealand Shipping Company, Houston Line, Ellerman Bucknall Line, Furness Withy & Co., White Star-Dominion Line, and the Canadian Government Merchant Marine are all represented in the list of wharf holders. These of course represent foreign going vessels only, and there are besides these the various inland navigation companies, and the coastwise and St. Lawrence navigation companies.

From Vancouver we find also a list of sailings covering a number of different companies, and from this port there are sailings of vessels under the American and Japanese flags, as well as the British and Canadian liners. On the west coast the Canadian Pacific is well to the fore, as is only natural, they being established in this service for many years, and having the finest vessels in the passenger service between the west coast of North America and the Far East. Among the English companies sailing from Vancouver are the Alfred Holt Co., better known as the Blue Funnel Line, the Royal Mail Steam Packet Co., Furness Line, Harrison Line. There is of course the Canadian Government Merchant Marine with services to Australia, and Mexico through the Panama Canal. The Canadian Robert Dollar Line, a branch of an American firm. The Luckenbach, and the Admiral Lines, both American companies, and last but not least the Japanese Osaka Shosen Kaisha, and Nippon Yuson Kaisha.

There are many other vessels besides those of the lines mentioned calling at Vancouver for cargo during the twelve months, but these companies are those maintaining regular services, which means more to a port than the casual visitor, although they too bring their share of business. The trades routes of all these ships sailing from both eastern and western ports pretty well cover the globe. There is the great passenger trade from the United Kingdom and Continent to Canada which finds its way in through the eastern gateways, and a considerable number of whom are bound right through to the far east by rail and sea from Vancouver. The vast majority are the newcomers to the country who are intending to settle down and make their homes here. This trade is one that continues all the year round, to Halifax and St. John in the winter, and Quebec and Montreal in the summer. There are sailings of freighters, some of which carry a few passengers to and from South and West Africa, South America, Australia and New Zealand, West Indies and Mexico, India and the Far East, and Mediterranean ports, from our eastern coast.

From the western coast ports we have the chief trade with the Orient, but there are also sailings to the Gulf of Mexico through the Panama Canal, and quite a few cargoes of grain and lumber have been shipped in the past few months to Europe and the United Kingdom by this route.

There is a very thriving trade from Vancouver up the coast to the northward by small vessels, which run up as far as Skagway. The C. P.R. maintains a passenger service on this route also.

Inland Navigation

Inland navigation on the Great Lakes supports a considerable number of vessels of their special type, and among those engaged in this form of commerce are the following:—Algoma Central Steamship Line, Dominion Transport Co., Great Lakes Transportation Company, Geo. Hall Coal Co., Marine Navigation Co., Imperial Oil Ltd., Keystone Transport, Montreal Transportation Company. These represent a few of the companies engaged in inland navigation, and does not include the vast number of ferries of various kinds which are used for crossing the channels and rivers of the border waters as long as navigation is open. In some cases this is all the year round, such as the service between the Sydneys and the Mainland, carried on by the car ferries, and the services between such places as Sarnia and Port Huron.

There is in addition a very respectable fleet maintained by the Department of Marine and Fisheries, consisting of tugs, tenders, ice breakers, etc., which look after the navigation aids which are established round our coasts, lay buoys and take them up in the spring and fall, visit lightships and lighthouses in isolated spots, keep up communication with otherwise isolated spots in the winter time such as the islands of the lower St. Lawrence, take pilots off to vessels and land them from outgoing vessels, and perform a vast number of useful duties.

All the foregoing would tend to show that although we are not what might be called a maritime nation, yet we have a considerable interest in ships and shipping, and a great deal of our prosperity must depend on having adequate service on the waters of the earth. There is no fear of us not getting this, for there are no people more enterprising and alive to opportunities than the shipowner, as we think is amply proved by the number of companies engaged in the Canadian trade at the present day. The most important thing to Canada is that she be provided with good and sufficient passenger accommodation, to transport to our shores the population that we need in the next few years, if we are to develop as we should. That need has been foreseen by the various liner companies, with the result that we have a splendid service to and from the U. K.

and Europe, the only drawback being the still high rates of fares that prevail. This will no doubt adjust itself in the near future.

We can look at this question of shipping and what it means to a country from two angles, first the actual worth of the merchandise which it brings and carries away, and the business it brings of itself independent of the cargo carried.

Imports and Exports

The total imports into Canada for the year ending March, 1921, were $1,240,158,882. Deducting the United States total from this, there were 383,545,452 dollars worth of goods imported from overseas, that is carried in by overseas trading vessels. The exports for the same period were $1,189,163,701 including the exports to the U. S. and deducting these there were $646,859,245 value of exports water borne. That is a total value of $1,030,414,697 carried to and from Canada in vessels. Of the total goods imported from and exported to the U. S. a small proportion would also be carried in inter-lake and coastwise steamers, so that the contribution of shipping to the commerce of Canada is thus a very valuable one.

Coal represented $17,000,000 of the exports, and although this is not separated in the returns, there is no doubt a large proportion of this was for bunker coal for steamers trading and calling for coal at Canadian ports.

Some Business Effects

With the arrival of the first ship on the St. Lawrence there is called into activity a whole army of men, to attend to the needs of cargo handling. These include the men who work on the ships themselves, getting the goods out of the holds, and handling the winches which pull the cargo up and land it on the docks. There, another gang of men are busy loading the cargo onto railway cars and motor trucks, and when the holds are emptied, the reverse process is gone through in loading. There is work for customs brokers and shipping brokers in entering and clearing the ships and their cargoes through the customs, there is money for the taxi-drivers and cab drivers who carry the passengers from wharves to hotels and railway stations. There is trade for the hotels in caring for the passengers who stop over on their journey, there is business for the ship chandlers who supply the vessel's crew and the vessel herself with needed supplies, which latter vary of course with the type of ship. The liners try and manage to have their supplies for the round trip to a certain extent, but there is always a lot of buying of fresh provisions. Water is purchased from the port authorities, who also collect dues for dockage, pilotage, etc. The tug owners of the port collect toll from the vessel owners for assisting her to her berth, and putting her into the stream on her outbound way. When this one steamer is multiplied by the hundreds that use the port in the course of a season, it is possible to get some idea of the value of shipping to a community. In the open ports, that is ports that are free of ice all the year round, this activity goes on from year end to year end, and in the case of our winter ports, the closing up of navigation on the St. Lawrence spells the speeding up of activity for Halifax and St. John. Were it not for the dread grip of winter, we should see Montreal eventually becoming the greatest port on the American continent. As it is, it ranks among the best.

We have no desire in this article to unduly stress the merits of Montreal, especially as some of the other ports think Montreal receives more consideration than it should. This, however, may be put down to local pride, and desire to help their own interests, for after all, Montreal is the logical port for the country for all shipping from the Western Hemisphere, as Vancouver is for the Eastern Hemisphere.

Another source of revenue to the country in general is the repair work carried out on vessels which do not belong to Canada, but are dry-docked in the various ports for ordinary cleaning and painting, or repairs to hull caused by the accidents which still unfortunately happen, and the numberless minor repairs that do not necessitate dry docking. These represent individually a small, but in the aggregate quite a large amount of money, and in every port there are engineering firms which find a steady source of revenue throughout the navigation season or the year round in this kind of work. This is not counting of course the work done on vessels which are owned and registered in Canada, and are laid up for the winter at the various ports on the coast and Great Lakes, and have all their work done during that time.

The last figures available show a total of 475,721 net tons of sailing vessels on the Canadian register, and 676,259 net tons of steamers. This has been as far as steamers are concerned, increased in great measure by the addition of the last of the ships of the C. G. M. M. which have been added to the registry since these returns were made. At the time when these returns were made, December 1920, it was estimated that a total of 34,000 men and boys were employed on vessels of Canadian registry, which represents a pretty fair proportion of the working population of the country. It is of course unfortunate that this employment is seasonal, but the season may be taken as averaging eight months, and during the off time, a large number of these men find temporary employment in other industries. A month or so before the opening of navigation a proportion of the crews are called on to join their ships and get ready for the season, and at the close of navigation a certain amount of time is required to prepare the vessels for their long lie up.

There is a certain amount of industry going on in the shipbuilding yards, actual new building being confined to the Great Lakes and one yard on the St. Lawrence. The building of ships for purely inland navigation and ferry services should be a possibility in Canada at all times, even if the hope of competing with other nations for foreign trade is a far off hope. With the growth of population and industry there will be a demand for more vessels of the lake type, and we have yards with ample experience in the building of this class of vessel, which should be able to secure these contracts, if costs are anywhere near those of the British builders.

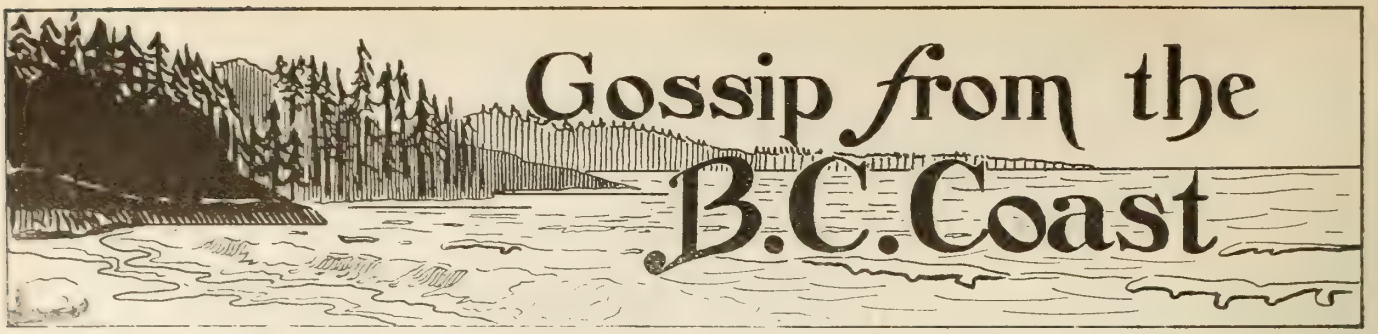
One can hardly neglect considering our great shipping venture, the Canadian Government Merchant Marine, when considering shipping in its relation to Canada. There seems to be little doubt, that the thing was carried too far, and the latter half of the vessels were built at a time when there was no need for them, and no possibility of them being a profitable venture. The operation of the whole fleet, while carried on by the managing executives, in a thoroughly competent way, has been attended with enormous losses, and in the present state of shipping, can hardly hope for any measure of success. The majority of the ships are of a size which does not make them attractive to outside buyers, even if they were put on the market, and the best thing to do with them would be to sell them for whatever they would bring and write the loss off as part of the expenses of the war.

Under present conditions the only ship that can hope to operate on a margin of profit is the one that is on a regular route, where she can be reasonably sure of having both an inward and outward cargo. The tramp type of ship is for the most part tied up, in all the ports of the world. A few of the C. G. M. M. are in regular trades, but a goodly number of them are either laid up or seeking cargo where it offers, and in both cases losing money at an alarming rate.

With the service given by the numerous shipping lines which are making a speciality of Canadian trade, there is ample competition and protection for the shipper, and a government owned fleet, always a doubtful experiment, has little reason for existence under the circumstances. What will be its eventual disposition, is a question for the government to settle, but it is the opinion of a great many men in the shipping world that the sooner the government goes out of business in this particular line the better it will be for the country in general.

The scheme that is being mooted for committing the country to an expense which is estimated in hundreds of millions of dollars, in building a waterway

(Continued on page 35)



WHETHER the Canadian Government Mercantile Marine will establish a direct service between Mexico and British Columbia ports will be determined in a few days, according to Pacific Coast representatives of the company. F. Young, a foreign trade expert, who investigated the prospects of developing commerce between Canada and Mexico, has returned and he will shortly submit his report to officials of the C.G.M.M. Although the contents of Mr. Young's report are not known, B.C. Keeley, British Columbia manager of the C.G.M.M., believes that if there is a chance for the company to make an even break on the operations the service will be inaugurated.

Atlantic freight rates have stiffened lately and this change has had an effect on bookings of grain from this coast to the United Kingdom and other Atlantic points. Oriental rates continue unaltered, but shipping companies are not considering offerings of wheat or flour at less than 37 shillings and 6 pence. Space is scarce. It is believed that the jump in Atlantic rates is due to the desire to effect a conference rate.

Prince Rupert has been having its troubles with a shortage of refrigerator cars to handle the halibut catch, and as a result prices have dropped. Boats laden with halibut are unable to discharge their cargo without considerable delay owing to the car shortage.

The spring salmon season will soon commence, and Japanese fishermen are preparing to follow the run, icing their catch and selling in the Seattle market in preference to Vancouver, because of higher prices.

Although the grain movement through British Columbia to the Orient continues active, the Canadian Government Mercantile Marine steamships are engaged now in carrying wheat from Australia to Japan, as well as from Canada. The steamers Canadian Britisher, Canadian Skirmisher and Canadian Importer have been chartered to carry Australian wheat cargoes to Japan, loading there for British Columbia ports with what freight they can pick up in the Orient.

The United States Supreme Court in Washington has handed down a decision upholding Section 27 of the Jones Shipping Act, thus putting an end to the practice of shipping American products to Vancouver and Victoria from American cities for transportation to Alaska in Canadian ships. Hereafter all such cargoes must be carried in American bottoms. The Jones Act clause was disputed by Alaskan importing firms, which held that it was unconstitutional by reason of the apparent discrimination against Alaska in being prohibited from participating in a practice that was allowed in trade between various parts of the United States.

Six new steamships aggregating 26,000 deadweight tons, will be built this year for the Osaka Shoshen Kaisha, according to a decision reached at a recent meeting of the company's shareholders. During the latter half of 1921, one hundred and fifty-four steamships, aggregating 447,780 tons, were operated by the Osaka Shoshen Kaisha on forty-eight different routes, bringing in a revenue of $13,136,000, by transporting 842,300 passengers and 40,139,000 tons of cargo.

Premier John Oliver has wired to Premier King, suggesting that action be taken at once with a view to getting the Federal Government to facilitate the granting of preferential rates on the Canadian National Railways for the carrying of Oriental freight brought across the Pacific by Japanese steamships. Such action, if taken advantage of by the Canadian National Railways, would give the Canadian road an opportunity of securing a large volume of the business that now passes through Seattle and other American ports on the Pacific coast. The United States Shipping Board recently issued an order preventing the Chicago, Milwaukee and St. Paul Railway from continuing its preferential freight agreement with the Osaka Shoshen Kaisha, the Japanese shipping company, It is expected that this order will divert much business to British Columbia, and if preferential rates are given by Canadian railways the proportion diverted will be considerably larger.

There is considerable congestion in the grain elevators at Vancouver, due to the fact that some of the grain has been shipped in faster than the ships were scheduled to call for it. The adoption of the permit system by the railroads is believed to have relieved the situation somewhat.

Grain has been coming steadily from the railroads all winter. In January 1,064,872 bushels were exported to the United Kingdom and 320,000 bushels to the Orient. The export figures for February were lower, the totals being 381,500 to U.K. and 585,000 bushels to the Orient. There were 370,000 bushels booked for March loading to the Continent and 726,000 bushels for Japan and China.

Other export figures for January and February show that business is keeping up well. February is a short month, but the volume of outward freights was good. In January 16,000,000 feet of lumber were exported; in February it reached 14,000,000 feet. The spelter movement to Japan and United Kingdom in the first month of the year was 81,000 slabs, while in February it was 286,000. Flour shipments in January were 108,000 bags, while February showed 167,000.

The salt fish movement is about over, so far as the Orient is concerned. The herring pack is through for the year, and while a promising demand for salt salmon was developed during the year, now that the herring pack is away, the whole movement will slacken. During the season about 33,000 tons of salt fish, mostly herring, were exported to the Orient. This B. C. product is valued at approximately $40 a ton, to the shippers, though the buyers have been making an extra good thing, getting $50, $60 and even $80 a ton in Japan. But $40 a ton means quite a sum to British Columbia industry. And the freight rate of $9 a ton means a lot to local brokers. The figures given for the provincial export of herring and salt salmon to the Orient do not indicate the full production of the British Columbia fisheries, as quantities were sent coastwise to Tacoma and Seattle to load there on deep sea Oriental vessels. It is estimated that Puget Sound ports handled about one-third the quantity sent out from Vancouver.

The strike of Chinese seamen at Hongkong, although it has severely hampered sailings of trans-Pacific ships during the last few weeks, is now hav-

ing little effect on the services between this coast and the Orient. All the Canadian Pacific steamships have been able to get crews, and the Blue Funnel Line boats have been similarly fortunate, although in some cases northern Chinese have been imported. The general strike of seamen and stevedores is said to have arisen from the fact that some of the Chinese-owned river boats and a few of the minor British-owned companies paid their men only $10 to $15 a month, out of which the men had to pay for their food and keep their families ashore. The trans-Pacific companies were paying as a rule $25 a month, with all expenses found. An educated Chinese steward, dismissed for incompetence, is said to have started the strike. This is the quaint text of the letter sent to various steamship masters in Hongkong, announcing the strike:

"To the Captain, Dear Sir,—We, seamen, serving on Board various steamers, in view of the high cost of living, have respectfully written to our boss requesting them to favor us with an increment. Not having been able to arrive at satisfactory result, we have at last turned our tendency to seeking of some other profession within 24 hours from above date."

The Pacific Steamship Company has purchased the steamship Great Northern, sister ship of the Northern Pacific, which was destroyed by fire February 8 on her way out from New York to enter the service of the Pacific Steamship Company. The Great Northern, which was being converted into a flagship for the American Atlantic fleet before its purchase, was used as a transport during the war, and is one of the fastest passenger vessels afloat. It is intended to use the steamer in the run between Victoria, Puget Sound and California.

The Nippon Yusen Kaisha has announced a reduction of about 30 per cent. in passenger rates between Japan and Victoria and Seattle. This announcement followed closely on the statement given out by the company that the company's big liners Katori, Suwa, Kashima and Fushimi, would be withdrawn temporarily from the service and transferred to their former run to Europe, being replaced on the Pacific routes by smaller vessels. Other Japanese companies and the Admiral Line have declined to make any reduction at present.

Wreck Commissioner J. D. Macpherson has recommended that a new investigation be held into the near-foundering of the Canadian Government Merchant Marine steamship Canadian Importer last August. New witnesses that could not be found at the time of the first inquiry have since been located. Capt. Macpherson held that the first inquiry was unsatisfactory in that there was a studied reluctance on the part of the officers of the steamship to tell all they knew about the cause of the disaster.

It is understood that Capt. G. H. Cates has reconsidered his salvage claim against the Admiral Line steamer Admiral Farragut, and has reduced his claim below the initial request for $25,000.

The Trans-Atlantic Steamship Company, of Gothenburg, Sweden, will shortly enter the Pacific sea-carrying trade with a service that will connect Puget Sound and possibly British Columbia ports with northern Europe by way of the Panama canal.

Vancouver will not be included in the round-the-world itinerary of the ships of the Robert Dollar Company, but it will be served by the company's vessels operating in the trans-Pacific triangular services. The company has recently purchased four new ships from the United States Shipping Board, one of them, the Cathay, having been re-named the Diana Dollar. All these vessels will operate out of British Columbian ports.

The firm of Yarrows, Ltd., Esquimalt, has been awarded a contract for repairing the superstructure of the steamship Bessie Dollar, which was badly damaged in storms off Cape Flattery early in February. When tenders were first called for, several Canadian and American concerns filed bids, but all were so high that the Dollar Company intimated that it would have the job done in China. The Yarrows yards later shaved down their estimate and by undertaking to get the work done in twelve days were given the job, to cost $30,000.

Canada should take immediate steps to dispose of her merchant marine fleet to private interests, is the belief of Stanley Dollar, son of Captain Robert Dollar, and one of the executives of the Robert Dollar Company. "After reading the enormous losses the people of Canada are registering annually on the Canadian Government Merchant Marine, I can only say that it is time that Canada disposed of her ships to private concerns and let out a little slack in her tight taxation that goes to pay for these terrible deficits," said Mr. Dollar. "What is everybody's business soon becomes nobody's business, and this is a serious matter where there is such a large investment."

It is probable that the cable ship Restorer, owned by the Commercial Cable Company, will shift her base from Charleston, Wash., to Esquimalt, B.C., in a few days, and advices are now being awaited from New York headquarters to confirm this arrangement. Before the war the Restorer made her base at Esquimalt and flew the British flag, but the ship's registry was changed to American in order to afford protection from hostile craft believed to be in these waters at that time. It is reported that the Commercial Cable Company will have to pay $250,000 duty to the United States Government if the Restorer remains under the American flag.

The last floating unit of the Sir John Jackson Company, Ltd., builders of the Victoria breakwater at Ogden Point, will leave Victoria shortly when the hopper-barge Hercules, used in carrying rubble from Albert Head to the site of the breakwater, will be dispatched to England. The Hercules was brought out here in 1915 from Singapore.

Although the strike of Chinese seamen in Hongkong is no longer affecting the sailings of Canadian Pacific steamships, the liner Empress of Japan is still in that port, and it is reported that this is an indication of the vessel having been sold. The Empress of Japan, which is one of the oldest of the larger ships now engaged in trans-Pacific trade, was sought by the Pacific Steamship Company last year, but the deal was called off because of opposition from Washington, D.C.

Duplication of the all-British trans-Pacific cable to Australia will probably be commenced this summer. Sir Babington Smith, chairman, and other members of the Pacific Cable Board, are expected on the coast in a few days to inquire into the problem of chartering a new course for the cable in order that new territory may be brought into direct communication with Canada. During the last ten years, and especially since the break caused by the Germans at Fanning Island early in the war has been restored, the cable service has made considerable money, so that the question of expense will not be a dominant factor in the extension plans now under consideration. The duplication of the cable, it is said, will cost about $20,000. It is reported that the plans of the Pacific Cable Board include the laying of a six-wire cable between Vancouver and Bamfield, on the west of Vancouver Island, where the trans-Pacific cable to Australia leaves the shores of Canada.

Washington:—The United States navy has sold a considerable number of its wireless sets to owners of Great Lake vessels, who are fast coming to the conclusion that it is well worth while to equip their vessels with this means of safety. The Navy Department now maintains no less than fifteen stations, extending from Duluth to Buffalo, and three of them are radio compass stations, located in the most dangerous portions of the lakes, that is Whitefish Point, Detour Point, and Grand Marais. By their aid vessels fitted with wireless can check their bearings in thick or snowy weather, and know how they stand with regard to the shore and other vessels in their immediate neighborhood.

St. Thomas:—The Pere Marquette ferry "Bessemer," arrived at Port Stanley on the 5th March, having made the first trip of the season from Conneaut, Ohio.

Notes From Quebec and The Maritimes

THE PORT of Quebec is getting ready for the 1922 summer season of navigation. The newly appointed Harbor Commission, of which Mr. W. G. Power is president, is holding board meetings daily to discuss questions and decide upon matters for the better equipment and shipping facilities at the port. The Government steamers and lightships engaged during the season of navigation in the River St. Lawrence from Quebec to the open sea, are being thoroughly overhauled, as well as the vessels used in the coasting service in the lower St. Lawrence, and will be ready for April 15. The St. Lawrence Fuel Oil Co., is now engaged in the instalment of the large fuel supply plant to be located at the north west end of the Louise Gasin. This plant is the outcome of Canadian enterprise, and the only real up-to-date supply station for the use of the oil-burning steamers in the St. Lawrence trade. The plant will be equipped with motor driven pumps, and two oil storage tanks each with a capacity of 9,000 tons, or approximately 55,000 barrels each. Piping from the plant will be extended to every steamer dock, and when required fuel oil will be pumped from the tanks to any steamer docking at Quebec, or calling on the way to or from Montreal.

The port of Quebec will be the terminus as usual for the Canadian Pacific steamers, "Empress of Britain," "Empress of France," and the latest addition to the company's fleet, the "Empress of Scotland." These three Empresses have too deep a draught to permit them passing the natural deep water harbor of Quebec, though the company's smaller passenger and cargo steamers will continue on to Montreal, after landing their immigrants and all third-class passengers, for the immigration, civil and medical inspection. The immigrant buildings located on the Louise Docks, convenient to all docks in connection with the incoming steamers, are the largest and best equipped buildings in the world for the handling of immigrants. Besides the inspection apartments, baggage checking rooms, dining room, etc., and offices for the staff of Government immigration officials, the buildings are further equipped with dormitories and bedrooms and lavatories for the accommodation of the new arrivals who are going on to Ontario, or the west. In further enhancement of the accommodation and facilities for handling large numbers of passengers, the first floor of the big building is fitted up with railway ticket offices. There are three transcontinental railways operating their train service on the Louise Docks, which come up to the very doors of the immigration building to receive their living freight. They are the Canadian Pacific, Canadian National, which includes of course the Canadian Northern, Grand Trunk, Intercolonial, Quebec and Lake St. John. All these lines have a staff of efficient agents meeting the boats, as well as interpreters attached to the offices in the immigration building, who look after the new arrivals with every care and attention. There are offices for provincial government agents, chaplains representing all religious denominations, and children's nursery in charge of the Red Cross, with a staff of trained nurses.

After inspection the immigrants are forwarded to their respective destinations in the various provinces, in through passenger trains of the several railroads according to pre-arranged transportation. Thus it will be seen that the system of handling and taking care of immigration at the port of Quebec cannot be duplicated, let alone excelled, in any other Canadian or American port.

There are one Canadian and three British lines engaged in the St. Lawrence trade which carry on a large passenger traffic, and feature the carrying of immigrants from Europe to Quebec. The C. P. R., with steamers from Liverpool, Glasgow, Havre and Antwerp, the White Star Dominion Line, the Cunard, and the Anchor Donaldson also maintain services from these ports, while there are numerous independent steamers arriving from Continental ports at intervals. A feature of this year's business, which will be opened by the arrival of the "Empress of Scotland," will be the number of large new liners put on the service by the different companies.

The coasting trade down the lower St. Lawrence is receiving more attention than usual. The Clarke Steamship Co., which desires to open up and develop the lower St. Lawrence, is bringing over from England a new steamer to be added to its fleet, which will run from Quebec to all intermediate ports along the south shore to Gaspe. This company, comprising in its personnel the younger members of the Clarke family, well known in Toronto, and the Great Lakes shipping trade, have been for some years past studying the dormant resources of the lower St. Lawrence, on both the north shore to the Gulf, and the Gaspe Peninsula, and have gained considerable knowledge of a wealth of reserves which remain to be developed, and are determined to be the pioneers of this development. They are practical in their methods, and efficient in system, and are bound to meet with successful results. It will take some time, but before the passing of another decade the Clarke Brothers will be a recognized factor in the affairs of the port of Quebec.

There is not a great deal of shipbuilding going on, the most important recent development being the taking over of the Three Rivers yard by the Fraser Brace Co. of Montreal, who are building four vessels there. There are a few small vessels in the two Government dry docks adjoining the premises of the Davie Shipbuilding & Repair Co.

NEWS FROM SOREL

There are four dredges, four tugs, and coal barge No. 6 in the Government shipyard, and they will be put into commission during the coming season. The barge is on the ways under repairs to plates, etc., and she will be ready early in the season. The steamer "Reserve," which has undergone extensive repairs, is ready to come off the ways, and she will be put into commission in the near future.

The fleet of the Sincennes McNaughton line is all ready for the coming season, while the tugs of the Montreal Transportation & Shipping Co., are on the ways in the Manseau Yard. The insurance companies, on whose account the repairs are being executed, the tugs having been damaged while working at the wreck of the "Canadian Recruit" last fall, state that the work is about completed, and the tugs will be ready and in good shape for the opening of navigation. At the Manseau Shipyard, there is also the "Soulanges," which is on the ways being widened three feet. The "Boucherville" used in and around the harbor of Montreal, is also being replanked, about 50 per cent. new planking being built into her. The barge "Richelieu" used as a ferry between Verdun and La Tortue, is also being re-planked. All three will go back to their same route. The steamer "Terrebonne," which plies between Montreal and Chambly Basin, is having a new pair of feathering wheels fitted by the Sorel Mechanical Shops, and she also had her boilers raised and examined. She is owned by Mr. Dansereau of Sorel.

The "Duchess of York" has had a general overhaul and extensive repairs, and is now being repainted in readiness for the season. She will be assigned to the Montreal—Three Rivers route, carrying freight, and she will also be available from time to time for excursion parties. Several dates have already been booked for this purpose. She is owned by Mr. J. O. Normand. The steamer "Francois C," owned by Mr. Beaudet, has had several improvements made to her during the winter, and she is now ready to go under steam at two days' notice.

The "Saguenay," "Cape Diamond" and "Longueuil" of the Canada Steamship Lines had extensive repairs to machinery, and general repairs to hull, and are now ready to go into commission.

NOTES FROM HALIFAX

Captain W. C. Stewart, for several years master of the Commercial Cable Company's steamer Mackay-Bennett, having taken command when Captain Larnder went to England to superintend the building of the new ships, is now in England waiting to take command of the new George C. Ward, now being completed. Captain Stewart was on the Mackay Bennett about fifteen years and before taking command was chief officer. Captain W. C. Livingstone, formerly chief officer, is now in command of the ship.

P. J. Jenson, for twenty-five years chief boatswain and cable foreman on the Mackay-Bennett, has also been sent to England to join one of the two new cable ships. It is likely that he will be attached to the John W. Mackay.

Burns and Kelleher, Marine Engineers, did considerable work on the Cunard Liner Scythia, when she was recently delayed here with turbine trouble. The steamer arrived here from Liverpool and could not proceed to New York until some repairs had been made. She had trouble with her port engine and it would not go astern. It was found that the blades in the turbine were bent and as permanent repairs would delay the ship too long the local firm were commissioned to put the engine in order so the Scythia could reach New York. After three days work this was accomplished, the steam connections being transferred from the high pressure to the intermediate and then to the lower. Thus the ship proceeded to New York. She is now laid up in England where permanent repairs are being made and her engine being thoroughly inspected.

The appointment of Captain J. F. Lindsay to the post of deputy port warden for the Port of Montreal is favorably received here. Since 1913, Captain Lindsay has been a resident of Halifax and during the war was in charge of the Camperdown Signal Station. Since the war he has been in the automobile business here and made many friends. He will take up his new duties immediately.

The auctioning of two tern schooners in Halifax recently proved a striking contrast of the tonnage question to-day to conditions that existed three years ago. Both vessels were sold for a small portion of what they cost, yet they brought good prices under present conditions.

The sales referred to were those of the Marine and Favonian, two splendid vessels that were turned out of Nova Scotia yards when the scarcity of tonnage was a national problem. The Marine was purchased for $7,800, less than a tenth of what she cost three years ago, when she was constructed for a price in the vicinity of $80,000.

The Favonian brought a better price when auctioned. She was sold for $12,000 and cost three years ago in the vicinity of $90,000.

These prices may seem small when compared with building costs but both vessels brought a fairly good price under present conditions. The tonnage market is overcrowded and there are more vessels offered for sale than there are prospective purchasers. Scores of fine Nova Scotia vessels are laid up in various ports awaiting an improvement in the charter market and many now in commission are accepting charters at a small rate, providing but a small profit over expenses.

It is difficult to ascertain whether conditions are improved over those of a year ago, but it is certain, as far as Nova Scotia vessels are concerned, that there is plenty of room for a much greater improvement.

SHIPBUILDING AT THREE RIVERS

Four up-to-date steel single screw Lake Freighters of full canal size classed with the British Corporation of shipping B. S.* with "freeboard" coasting and lake service are being built by Fraser, Brace, Limited, at their shipbuilding plant, Three Rivers, Quebec, for the George Hall Coal Company, Limited, Canada.

The principal dimensions are length overall 258 ft. B. P. 250 ft. x 43 ft. x 20 ft. 6 in. moulded, with a full Topgallant Forecastle and long raised Quarter deck aft.

Under the forecastle accommodation has been provided in the way of staterooms de luxe for passengers and spacious quarters for the officers and pilot, all in separate rooms with baths, W. C., etc., complete.

The Captain's rooms are placed on the Forecastle deck and consist of sleeping room, office, bath room, etc. The navigating bridge is placed over the captain's room, extending the full width of the vessel with a wheel house containing the steering wheel, compass, docking telegraph, telephone, speaking tube, engine room indicators, etc., and the standard steering compass on top.

The dining saloon, engineers, stewards, pantry, refrigerator room, galley and engine room staff, including deck hands are accommodated in a 60 foot house aft on the quarter deck.

The vessel is built on the Isherwood principle with water ballast in the cellular double-bottom divided longitudinally for about two-thirds the vessel's length for trimming purposes in working cargo. Water ballast is also provided in the fore and after peaks.

Two cargo holds with 6 large hatches two of which are specially large for handling beams and billets of 60 feet in length. The vessels have also been designed to carry heavy pump wood cargoes, in the holds and on deck.

Powerful steam and hand steering gear is placed aft over the after peak controlled from the wheelhouse forward and top of deck house aft.

Three steam winches for the rapid handling of cargo and two specially designed steam winches for warping purposes.

A steam and hand combined windlass of the latest improved make is placed on the forecastle deck with one of the warping winches placed alongside for warping purposes. Hall's patent snubbing wire compressor and the Geo. Hall Company's special fairleads and bollards all combine to make the working of the vessels in and out of docks and canals quick and efficient.

Two steel pole masts and three heavy derricks are provided for working cargo. Elm rubbers are provided on each side of the vessels for protection in passing through lockways.

A complete system of electric lighting throughout the ships with large clusters for cargo working, regulation signal amps, etc.

The anchors are stockless housed in hawse pipe pockets of special form.

The vessels have been designed to carry about 2,500 tons deadweight on a canal draft of 14 feet with a capacity of about 120,000 bushels of grain and for deep sea trade which has been specially considered as to scantlings, etc., a draft of 16-6 with a corresponding deadweight speed of 12 miles fully loaded.

The propelling machinery consists of one set of triple expansion engines 19 in. x 32 in. x 56 in. and 36 in. stroke and two Scotch multibular marine boilers 14-7 dia. x 10-8 long, with a working pressure of 180 lbs. per square inch.

The vessels are coal burning with bunker accommodation of 150 tons. An ash ejector is provided in the stokehold for the discharging of ashes.

The ballast pumps and auxiliaries have been carefully thought out and extra large pipes fitted to the ballast tanks for rapid filling and emptying.

The design of these vessels has been carefully thought out by the owners and builders that every modern improvement has been taken advantage of. Economy in handling the vessels, working cargo rapidly, etc., to such an extent that even the usual method of obtaining the ice for domestic purposes at calling ports is obliterated and an up-to-date refrigerating plant provided for making ice and keeping the refrigerating chamber cool and providing cold water for the ships' use, and in every way to make the ships a success commercially, and for the comfort of the officers and crew.

The plumbing system is up-to-date and provides water purifiers, baths, W. C.'s, lavatories, etc., for all with constant supply of running water, and hot water where necessary.

Two life boats with patent davits and disengaging gear are fitted aft on top of the deck house.

The work of construction is going on rapidly and the vessels will be ready to go into commission early this spring.

Yarrows Limited, Vancouver, B. C., has been awarded the contract for repairs to the Government steamer Givenchy which struck and was submerged for six weeks near Bella Bella, three months ago. The work will cost about $10,000.

What British Shipping is Doing

SIR FREDERICK LEWIS in his presidential address to the Chamber of Shipping in London, struck on the whole an optimistic note. While deploring the state into which shipping had fallen, he drew attention to the fact that British shipping had passed through such periods before, and had emerged into prosperity after the abnormal times had passed. He pointed out that the reason so many ships were idle was the high operating costs, and while shipowners did not want to see wages come down to the pre-war level they were faced with unrestricted competition from foreign countries and had to meet it. While wages were above the pre-war period, time charter rates were down to the levels of 1913. Another factor was the high cost of repairing and he stated that many vessels are going without badly needed repairs simply because they could not afford to have them done at the present-day costs. Shipowners were receiving delivery of ships at prices away above the money received as compensation for vessels lost by enemy action, and also far above their present-day value. The only thing to do was for the owner to write off from 50 to 75 per cent. of their value immediately, to put them on a proper capital cost basis. He pointed out that the business of shipowning was on the eve of as great a revolution as that of the change from sail to steam, by which he meant the change from steam to motor engines. Referring to the discriminatory legislation proposed by some competitors, he stated that this might be carried to the point where every country would have to send out their ships in ballast to bring back the imports of that country, unless the comic opera remedy of transhipping at a point half way on the high seas was resorted to. Sir Frederick stated that a most important service which the British Government could perform, would be the exemption of British taxation from the ships of those countries which did the same for British ships. On the whole, he thought that with the reduction of the high costs under which they were now suffering, which made itself felt both in the actual ship operation and the loading and unloading in port, they would emerge from the period of depression successfully, even if it was with chastened spirits.

THE ANNUAL report of the Chamber referred to the year 1921 as the worst in the memory of shipping memory. The time charter rate which was in 1920 twenty-five shillings for twelve months general charter, had fallen in that year to 10 shillings, and in 1921 had fallen between five shillings and five and sixpence, and in the latter three months had fallen below the pre-war level. Index number for freights dropped from 100 in 1920, to 29 in December, 1921, "and at the end of the year the depression in shipping had reached a point at which it could confidently be asserted that it could go no further in view of the failure of receipts and expenditure to balance. Such cargo vessels as remained at sea were being operated at a loss which could only be met out of reserves of capital, while liners were being operated without any profit, and often at a loss." An interesting feature of the report is a statement of the average age of vessels on British register. This shows that in November 1921, there were 45½ per cent. of the number and 55 per cent. of the tonnage of British steamships of 100 gross tons and over built subsequent to 1910. The total gross tonnage of those not over ten years of age was 10,000,000. Sixteen per cent. of the tonnage was represented by steamers and motor vessels of over twenty years of age.

THE ALFRED HOLT Co., owners of the famous Blue Funnel Line, are fitting one of their new ships, for which a contract was recently placed with the Scott Engineering & Shipbuilding Co., Greencok, with a Scott-Still engine, which is being built under license from the Still Engine Co. Much interest is being shown in engineering circles in this installation, as it is the first engine of this type to be fitted in a vessel. The engine, which has been described in detail in the columns of this journal on different occasions, is designed to use both steam and oil. The cylinder is arranged so that the driving power on the upperside of the piston is derived from the combustion of oil, as in the ordinary combustion engine, while on the upstroke the piston is driven by steam. This steam is generated by the heat of the cylinder liner and waste gases, so that practically all the waste heat is utilized. For starting purposes a small boiler is provided, known as a regenerator, and when the engine is ready for starting up, an oil burner is lighted under this regenerator. The water in the boiler has a free circulation through the water jacket of the cylinder and back to the boiler. As soon as the water begins to heat, it circulates naturally from boiler to jacket and back, and as steam is formed it warms up the cylinder liner to the temperature of the steam. The steam thus generated is used on the bottom of the piston for starting purposes, and as soon as the engine is running, the burners are shut off. The circulation of water then becomes reversed, owing to the higher temperature of the jacket and the steam produced goes to the regenerator and thence to the piston. The twin engines will have a capacity of 2,500 b. h. p. and each set will have four cylinders, twenty-two inches in diameter with a stroke of 36 inches, running at 120 revolutions per minute. The trials and subsequent voyage of this ship will be watched with keen interest by the whole engineering world, as this engine has shown on test the highest thermal efficiency yet attained.

IT IS A FEATURE of English jurisprudence that the judge of the Admiralty Court also acts as a judge in the Divorce Court, the reason often given being that the amount of perjury in these courts is greater than in any others, and about equally divided between the two. At a recent dinner of the Society of Consulting Marine Engineers and Ship Surveyors, Mr. Justice Hill was allotted the task of replying to the toast for the guests. In doing so he referred in a jocular manner to his work in the two courts. He said that the slump in shipping had taken a great deal of his work away, and instead of dealing with ships, he was now dealing with spouses. He now had to deal with conjugal collisions as well as those of the high seas, to say nothing of errors of—well—navigation. He felt that with his work in the Divorce court and the Admiralty court he had one foot in the sea and the other in the sewer. He loved a seaman, even if he lied, but he detested an adulterer whether he spoke the truth or not.

THE "Mauretania" after being laid up for several months during which she has been converted from a coal burner to an oil burner, and has been painted and decorated, has now returned to her former run, that is New York, Cherbourg and Southampton. The difficulties of handling a vessel of this size in narrow waterways such as the Tyne where the repairs took place, may be estimated by the methods adopted to get her down to clear water. Six tugs were used in the process, and until she reached Tyne Dock, near the mouth of the river, she was towed stern first. To cover the six miles between the yard of Swan Hunter & Wigham Richardson, and the mouth of the Tyne between the two

Shields, took one and a half hours. This to a vessel that can steam 26 knots is pretty slow going.

TWO RECENT cases show the value of the wireless direction finder from a viewpoint of safety of life at sea. In one case the steamer "Fanad Head" rescued the crew of the Norwegian steamer "Ontaneda," which was in distress and sending signals for assistance. The position given by the captain of the distressed vessel, and determined by dead reckoning, was nearly 100 miles from the true position, but by means of the wireless the vessel was accurately located and the crew saved. A similar case was that of the Norwegian steamer "Mod," which also gave a wrong position to the "Melmore Head," which was responding to her signals, but again by observing the increase or decrease of strength of the wireless message, the rescuing ship was enabled to arrive in time and rescue 23 men. It is peculiar that the rescuing vessels should both be of the same company, and the rescued vessels' crew be in both cases Norwegians.

THE "Syren and Shipping" remarks that Sir John Biles has gone to Canada in company with Sir Thomas Fisher on board the "Minnedosa," and expresses the opinion that the visit is in connection with the designing and ordering of some more ships for the C. P. S. They base this deduction on the fact that Sir John Biles is consulting naval architect for the C. P. S., and we would consider their deduction a fair one.

THE "ALSINA," a handsome twin screw passenger steamer built and engined by Swan, Hunter, & Wigham Richardson, Ltd., at their Neptune Works, Newcastle-on-Tyne, to the order of the Societe Generale de Transports Maritimes a Vapeur, of Marseilles, has just completed very successful trial trips off the Tyne.

She is intended for the passenger and cargo and meat service carried on by her owners between France, Italy, Spain and South America.

In 1920 the builders completed for the same owners the "Mendoza," a sister ship to the "Alsina," and she has had many very successful voyages on the same service, and has become a favorite ship amongst those travelling on her route.

The "Alsina" is 470 ft in length x 58 ft. beam x 34 ft. 3 in. depth. She has a cruiser stern, and is built to attain the highest classification in the Bureau Veritas Registry as well as in the Registro Nationale Italiano, and is sub divided for safety in accordance with the rules of the International Convention.

The accommodation for first class passengers is very comfortable and even luxurious, including a handsomely appointed dining saloon, a spacious music saloon, a smoking room in the Dutch style, and a handsome entrance hall and staircase. On the promenade deck are also arranged two de luxe suites each for two passengers, whilst the adjoining stateroom can be put into communication with them if desired. There are also other large and comfortably fitted staterooms for first class passengers, for one, two and three persons respectively. The first-class dining saloon will seat 80 persons and is beautifully fitted in light polished wood decorated with gold. The room is furnished with small tables, the largest table accommodating 8 persons. The dining saloon is approached by a handsome entrance hall in unpolished oak with some unusually fine carved work. Outside the dining saloon there are two special cloakrooms for coats, hats and sticks.

There is accommodation for 80 second-class passengers in staterooms on the awning deck including a well-furnished dining saloon on the same deck, and a very comfortable smoking room on the bridge deck.

Accommodation is arranged for 62 passengers of the economic second-class in 8 rooms on the awning deck with their dining saloon on the deck immediately above.

The Captain's quarters are large and well fitted and the accommodation for the officers and engineer officers, doctor, purser, etc., is of a very high class. There is also provided an operating room for the doctor, hairdresser's shop, plenty of bathrooms, passenger baggage rooms, etc., etc.

The sailors are berthed forward, and the firemen and stewards amidships, with separate mess rooms.

Arrangements are made for the carriage of a large number of emigrants in the tween decks, with ample galleys and cooking arrangements, bakery, distribution storerooms, etc. There are also hospitals amidships, and infectious hospitals well isolated in the after part of the vessel.

The principal cargo holds and tween decks are insulated for the carriage of frozen meat. The refrigerating machinery being by Messrs. J. & E. Hall.

As the vessel travels through the tropics, the ventilation of all spaces occupied by passengers of every class has been most carefully considered, and there is also an installation of heating for cold weather.

The machinery has also been supplied by the Neptune Works of Swan, Hunter, & Wigham Richardson, Ltd. The twin screws are driven by double reduction geared turbines of the Metropolitan-Vickers Rateau type, supplied with steam by six single-ended boilers fitted with Robinson's superheaters burning either coal or oil under the Wallsend-Howden system. The turbines have been constructed at the Neptune Engine Works under license from the Metropolitan-Vickers Electrical Co., Ltd., and Parsons Marine Steam Turbine Co., Ltd., Wallsend.

On the trial trip everything worked entirely satisfactorily and a speed of 17 knots per hour was fully maintained.

A LARGE oil tank steamer bein constructed in the Neptune Shipyard of Swan, Hunter & Wigham Richardson, Ltd., at Newcastle-on-Tyne to the order of the British Tanker Co., Ltd. of London was launched on Tuesday, the 14th inst.

The vessel is about 455 ft. in length x 57 ft. beam and is designed to carry over 10,000 tons of oil. She is being built to attain the highest class in Lloyds Register, and will be fitted with the most modern appliances for her intended service, including wireless telegraphy, Hele-Shaw steering gear, refrigerating machine, etc., etc.

The propelling machinery is also being constructed by Swan, Hunter & Wigham Richardson, Lt., at their Neptune Works, and consists of a set of double reduction geared turbines of the Metropolitan-Vickers Rateau type, supplied with steam by three large boilers fitted with Howden's forced draught and burning oil fuel on the Wallsend-Howden system. The principal engine room auxiliaries are electrically driven. The machinery is of sufficient power to propel the vessel at a speed of about 11 knots on service.

As the vessel left the ways she was named "British Grenadier," the naming ceremony being gracefully performed by Mrs. J. C. Stephens, wife of Mr. J. C. Stephens of London, the owners' superintending engineer, under whose guidance the steamer is being constructed.

ON WEDNESDAY, the 1st of March a steel screw steamer was launched from the Southwick Yard of Swan, Hunter, and Wigham Richardson, Ltd., to the order of the Cory Steam ship Co., Ltd., for their line trading between Manchester and Liverpool and Dutch and Belgium ports.

The vessel is 290 ft. in length by 42½ ft. beam, and is designed to carry over 3,100 tons deadweight on a light draft of water. She is being built to attain the highest class in Lloyd's register and will be supplied with a very complete outfit of the most up-to-date appliances for the navigation of the vessel herself and for the working of her cargo, including steam winches, steam steering gear, electric light, etc., etc.

The vessel is intended to be propelled by a set of triple expansion engines, which with their boilers, are being constructed at the Neptune Works, Newcastle-on-Tyne, of Swan, Hunter, & Wigham Richardson, Ltd.

As the vessel left the ways she was named "Rallus," the naming ceremony being gracefully performed by Mrs. John Slater, wife of Mr. John Slater, the Chairman of the Cork Steamship Co., Ltd., who was also present at the launch.

Kingston, Jamaica:—In order to attract ships from the Panama Canal which passed by the West Indies on their voyage, the government of the islands proposes to make Kingston a free port of call.

Press Comment on Marine Matters

MARITIME PORTS AND PORTLAND, ME.

A few weeks ago it was our duty, in asserting the rights of the maritime provinces with reference to railway and other matters, to speak somewhat plainly but nevertheless truly with reference to the "Toronto attitude" towards this portion of the Dominion. The Toronto Globe subsequently protested that the sneers and insults to which we took particular exception at the time did not represent the opinion or sentiment of Toronto, and the Globe, we are bound to say, did give to the maritime claims with reference to the International Railway a sympathetic consideration. That, we fear, however, did not indicate permanent conversion. The Globe now hurls itself into the breach as the champion of Portland, Maine, as the terminus of the Grand Trunk Railway and of the continued use of that harbor as a part of the terminal system of the national railways in opposition to the maritime ports of Canada.

While it admits that every thing in reason should be done to bring business to Canadian ports, it says "surely it is not expected that Portland should be abandoned as the terminus of the Grand Trunk Railway," and declares that "there is no more reason for abandoning it under public than under private ownership."

If Portland, Maine, is to be operated as a terminus of the national railway system, it will mean that the money of the people of Canada will be expended there on docks and other shipping facilities, and every effort will be made to attract business to the American port, while the maritime ports of Canada will be allowed to lie idle and stagnant. The maritime provinces have had to fight this question for many years. In the old days even the British mails to and from Canada were sent via Portland. It took a long and hard struggle—without the support of Toronto—to secure recognition of our ports, even in the matter of handling the overseas mails. As for our "national thinking" countrymen in Toronto, they were not concerned in the least that the advantages of Canadian ports should be ignored for this essentially national business. Even to-day, when a national system of railways has been created, they are openly advocating that the export and import business of Canada continues to be carried through Portland, Maine. All we have to say to this little Canadian and unpatriotic attitude is that the people of the maritime provinces do not propose to stand for a policy which means the building up of a foreign port at the expense of our own ports. Not a dollar of public money should be expended for handling business by way of Portland, Maine, which could be handled equally as well, if not better, through the ports of Halifax and St. John. It is absurd to talk about operating the Canadian Railways as a national system if they are not to be operated so as to promote trade through Canadian channels and to develop the Atlantic seaports of the Dominion.

The bulk of the traffic which goes out through Portland, Maine, we venture to say, is of Canadian origin, and every ton of it, so long as the facilities are available, should be carried to the Canadian seaboard and shipped overseas from Canadian ports. It is just as well that The Toronto Globe and other champions of Portland, Maine, should understand what the position of the people of the maritime provinces is at once. They have suffered the indignity of witnessing Portland, Maine, developed at the expense of their own excellent port, far too long. They now propose to stand up and fight for their rights until these rights are recognized and finally established.—"Halifax Chronicle."

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U. S. SHIPPING AID

President Harding has delivered to Congress a message commending action to re-establish a U. S. mercantile marine, a thing long desired as a matter of national pride and commercial advantage, but which past efforts have failed to secure. The relative importance of U. S. ocean shipping declined as first iron and then steel steamships supplanted the old wooden wind-jammers that carried the U. S. flag fairly over the world, and in some lines made the British sailor envious. The causes of what was practically a revolution were various. The United States entered on a period of development of land transportation and industrial growth that offered greater rewards than following the sea. Certain laws of Congress also tended to discourage ship building and ship management, making the ownership of vessels by U. S. citizens unprofitable in the world field of free competition. Various schemes for securing a better order have been advanced from time to time, generally in the way of subsidies for building or regulations designed to favor home craft in foreign trade. The war time creation of a great fleet of mercantile craft built at the public expense, it was thought, would do much to solve the problem; but it was a sad disappointment. The Government found itself with a marine elephant on its hands which not only failed to earn interest on its cost, but did not produce enough revenue to pay for operation and maintenance. The losses were given at approximately $16,000,000 a month. The President put the case: "To-day we are possessed of a vast tonnage, a large and very costly experience and the conviction of failure." What he called a mistaken policy was made more serious by the slump in world shipping which came late in 1920 and has not yet passed. The course to be pursued, he urges, is that "our existing ships should be sold at prices prevailing in the world market." This, it is added, will ultimately take the Government out of a business which has been, and is now, excessively costly and wasteful, and involving a loss in excess of the highest subsidy proposed. "It will bring to shipping again that individual initiative which is the very soul of successful enterprise." The lack of such individual initiative was, perhaps, more visible in connection with the U. S. Shipping venture than in connection with other like enterprises because of the magnitude of the plans and the great cost of carrying them out. Private enterprise is not to be left unassisted under President Harding's suggestions. A fund of $32,000,000 a year is to be created by allocating to the encouragement of shipping 10 per cent. of the customs taxes on foreign imports; it is to be required that not more than 50 per cent. of immigrants into the United States be transported on foreign vessels; the law providing for preferential rail and water rates on through shipments by U. S. vessels should be made effective; insurance should be made available at no greater cost than ships under foreign flags have to meet. By this means, it is hoped to establish on the ocean an important place for the U. S. mercantile marine and secure for the second line of national defence a supply of seafaring men to make up for the losses due to the going into force of the agreement for the limitation of naval armaments. The President's proposals have not met with universal approval. The opposition to subsidies to business enterprise at the cost of the taxpayers has been gaining strength. There may be long discussion, in and out of Congress before bills to give the force of law to the suggestions are passed.—"Montreal Gazette."

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SOLACE ON THE SEA

"Man marks the earth with ruin," says Byron; "his control stops with the shore." But now the ocean is ruined, according to a writer quoted by The New York Tribune. What is meant is that the Atlantic voyage is no longer restful. The Marconi system has put an end to isolation, and business pursues its votaries over what was once a place of rest and quietness.

The Leviathan will have a wireless telephone in every stateroom, and those who cross the ocean may keep in constant touch with their friends and business associates. There will be no more peace for the weary traveller. His office will tell callers to try "Leviathan 9535," and he will have to spend a greater portion of the time hanging onto the receiver when he is not hanging over the rail. It is not inconceivable that seasickness may become a blessing in disguise.

Already the benefit of an ocean voyage, for rest and recreation, has been impaired by so-called improvements. A voyage of five or six days is hardly enough for a holiday, and with all the luxuries of a great New York hotel, and with the habits of fashionable society continued on shipboard, the tired business man might just as well stay at home.

But there is nothing to interfere with a restful time on the restless sea if it is desired. All along the Atlantic coast there are places where one may find vessels that have neither wireless apparatus, ten-course dinners, steam or gasoline, and he may sail as they did a century ago, heedless of the passage of time, forgetting business and forgotten.—"Toronto Globe."

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PILFERAGE OF CARGO

A series of recommendations calculated to discourage pilfering from ships' cargoes is contained in the report of the special Pilferage Committee appointed in August, 1920, by the British Chamber of Shipping "to investigate claims in respect to pilferage and theft in all ports of the world, limiting the inquiries to such phases of the question only as particularly affect shipowners."

The extent of the evil of pilferage, says the report, may be gauged by the fact that twelve months after the armistice claims were paid by shipowners on a scale commonly twenty times as large as that obtaining before the war. In many instances it was considerably greater. The report suggests that by far the greatest factor in this increase was the debasing of the standard of common honesty caused by the war. When the committee commenced its labors, goes on the report, claims were still increasing by leaps and bounds, but to-day it can be said that they are steadily decreasing, and it is felt that a more thorough and general adoption by shipowners of the committee's recommendations would soon reduce the claims at least to the scale prevailing before the war.

In the opinion of the committee it cannot be emphasized too strongly that in the mercantile marine an essential part of the officers' duty is the supervision of all matters appertaining to cargo. For shipowners, the pivot of the situation is the system of tallies and watching. The committee recommends that tallies should be taken both in and out of ship, and states that it is especially important that this should be done when discharging on to open quays, or into lighters, or on to the quays of docks or warehouses not under control of the shipowner.

An officer or his representative should be appointed to each hold. Where sufficient officers are not available to supervise at each hold, substitutes should be appointed from amongst the petty officers, apprentices, wireless operators and other reliable members of the crew.

The committee recommends the extended use of the alphabetical system by those tallying on behalf of ship, which prevents collusion with those using continuous sheets tallying against the ship.

One Entrance to Holds

There should be only one entrance to cargo holds, namely, down the hatchway. All ventilators should be protected to prevent access to holds through them, and all hatches should be fitted with bars and locks capable of being quickly and easily manipulated. During meal hours, the deck should never be left without an officer in charge.

If during the course of a voyage, pilferage or tampering with the cargo has been discovered by the officers, the committee recommends the master of the ship to communicate by wireless with the agents, requesting them to send detectives on board before the ship is moored.

Where goods are tallied by the ship within sight of the ship's rail, dock and harbor authorities receiving the cargo should always give receipts for same. The authorities should be more strict in the scrutiny of persons allowed to enter and leave dock and harbor premises. The committee recommends that port authorities should accept full responsibility for all cargo not removed from transit sheds within 72 hours from final landing of the goods.

When, during the discharge, packages are discovered which have been tampered with, or damaged in any way, the committee recommends that (1) such packages should be retained on board the ship under the officers' supervision until they can be discharged and their condition certified, or (2) immediately on landing placed in a special cage or lock-up. Such packages should be immediately weighed and the weight marked on the package. Shipowners should bring pilferage claims at all ports under the scrutiny of a well-equipped department at the head office, and should prosecute every detected case of pilferage.

The committee strongly deprecates the custom of issuing bills of lading for goods "received for shipment," except where the circumstances make no other form appropriate; such a system gives scope for pilferage.

Shipowners should reserve their right to reject goods appearing to be insufficiently packed. Special goods, specially addressed packages and returned packages should always be carried in lock-ups. Customs officials should mark with an official stamp or seal all cases and casks from which samples have been extracted.

The committee suggests that shipowners should revise their standing instructions to masters and officers in reference to the care and handling of cargo.

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FARMERS AND WATERWAYS

The leader of the farmers' bloc at Washington announces that the Representatives of the Middle West will veto any ship subsidy bill unless Congress sanctions the deeper St. Lawrence project. The President again expressed approval of the St. Lawrence scheme in submitting this week his recommendations for a ship bonus. The United States Government will go out of the shipping business and sell its new merchant fleet, most of which is lying idle, but it will try to hold the maritime headway gained during the war by a policy of subsidies to private shipping concerns.

The President's plan drops the previous proposal of preferential duties on imports brought in United States bottoms, which might have invited retaliation by other countries. Instead, 10 per cent. of all duties collected on imports brought in American or foreign ships would be credited to the Merchant Marine Fund for the purpose of the subsidy. The bonus would be one-half of one cent for each gross ton of any vessel, regardless of speed, for each 100 miles traveled. It would increase with the speed of the ship, the maximum being 2.6 cents for each gross ton for every 100 miles traveled, when the speed was 23 miles an hour and more. The bonus would cease when a vessel earned 10 per cent. of its cost, and 50 per cent. of any net earnings over 10 per cent. would be paid into the Marine Fund. It is estimated that the subsidy would total $15,000,000 this year, and rise to $30,000,000 annually.

The bonus project has been a subject of discussion for years, but every measure has been defeated, mainly through the opposition of the agricultural interests. The farmers' bloc to-day is opposed to the principle, but sees an opportunity to win support for the St. Lawrence scheme from non-agricultural Representatives in Congress who favor the ship subsidy. This is log-rolling, but so is the whole system of government when various industrial or occupational groups compete for public money or the privilege of levying on the taxpayers for private gain. The St. Lawrence undertaking, however, is one against which the selfish and sectional interests which too often dictate public policy are arrayed. It is a great national and international enterprise in support of which both city and country, industry and agriculture, are united. If the farmers' bloc chooses to win votes for it in Congress by permitting the adoption of a ship subsidy bill it is trying to gain a praiseworthy end by tactics to which Congress has been habituated by many years of tariff manipulation.

Hopes are entertained that a permit will soon be granted to construct the proposed bridge over the Niagara River between Fort Erie and Buffalo.

Marine News From Every Source

Port Stanley:—Just as she was all ready to commence her fishing season, the tug "Glen Erie" of the Howe Fish Co., was burned to the water's edge at this port. She had her coal aboard, and all her gear.

Kingston:—Mr. J. F. Sowards, one of the prominent marine men of the city, made an announcement recently that the vessel's owners had decided to reduce freight rates by 25 per cent., commencing with the opening of navigation. This will occur as soon as the ice is out of the bay.

Montreal:—The leasing of sheds and wharfage for the 1922 season has been completed, and shipping companies are putting their sheds and equipment in shape in preparation for the opening of navigation. Last year the port opened on March 29th, and an early opening is being looked for this season also.

San Francisco:—A rumor has been prevalent here that the Bethlehem Steel Corporation would build a total of $15,000,000 worth of Diesel engines for the vessels of the Shipping Board, $8,000,000 at eastern plants, and $7,000,000 on the Pacific coast. No confirmation of this rumor has been given, but financial circles were inclined to accept it as correct.

Washington:—The members of the farm bloc, through their chairman, Representative Dickson, have stated that before any subsidy would be granted to the merchant marine, provision would have to be made for the improvement of the St. Lawrence and Mississipi navigation. They take the attitude that they cannot pay high railway rates and ship subsidies as well.

Washington:—A warning to mariners has been issued by the United States Hydrographic Department as to the presence of ice in the steamship lanes of the North Atlantic. There are extensive ice fields in all these latitudes. The lanes are described in the bulletin as being from longitude 47 west in latitude 40 degrees 30 minutes south eastbound; and latitude 41 degrees 30 minutes west bound.

Toronto:—The steamers "Dalhousie City" and the "Northumberland," have been overhauled during the winter, and will be already as soon as the navigation season opens to resume their trips to Port Dalhousie from Toronto. Passenger business is confidently expected to be good this season. The ferry steamer "T. J. Clark," has already commenced her trips across the bay to Hanlan's Point, and on March 14 the first motor boat of the season made the trip across the bay.

Toronto:—Speaking to a meeting of business men recently, Mayor Maguire expressed the opinion that Toronto was destined to become a great port. He also stated that freight rates were so high on the railways at present that they were hindering the development of the country.

Windsor:—It is announced by Mr. W. C. Kennedy, Minister of Railways, that the car ferries of the Grand Trunk Railway will be equipped to burn oil instead of coal, in an effort to get rid of the smoke nuisance. He also suggests that the Windsor council ask the Wabash Railway to equip their ferries in the same way, stating that at present oil prices the ferries could be run as cheaply as with coal.

Halifax:—The Holland American Line, which maintains a service between Rotterdam, Boulogne-sur-Mer, Plymouth, and New York, will resume calls on the west bound trip to land passengers, according to Furness, Withy & Co., their agents here. The vessels used to make this call before the war, but during that period they of course, in common with other lines, gave up the service. The service will be fortnightly.

Halifax:—That a racing schooner can also be a profit maker is shown by the record of the "Bluenose," the winner of the great fishing boat race last year. The statement of the Bluenose Schooner Company shows a profit for the year of $6,386, on a capital cost of $35,580. On her fishing voyages she made a profit of $1,862, while two trips to the West Indies with cargo yielded a net gain of $2,020. The races produced prizes worth $5,000, of which $2,503 were clear gain.

St. John, N. B.:—The "Canadian Raider" of the C. G. M.M. arrived at Hull,England so completely encrusted with ice that several schooners which she passed on her way in took her at a distance to be a floating berg. The "Canadian Raider" took a cargo of wheat from St. John, and soon after leaving that port she ran into heavy weather, and the seas and spray bursting over her decks were converted to ice in the zero temperature that prevailed. This ice was in places a foot thick.

St. Catharines:—Work on the harbor at Port Weller will be well under way by April 1st, according to the contractor, Mr. J. P. Porter. The dredge "Fundy" with her scows and equipment, which has spent the winter at Port Dalhousie, will be brqught down through the locks well in advance of that time. Dredging of the harbor and crib works on locks 1 and 2 will be started at least 15 days in advance of the opening of navigation. A large number of men mostly from the immediate district, are being engaged.

Port Arthur:—From Port Arthur comes the news of great activity in preparation for spring and the opening of navigation. The "Strathmore" is busy in the ice field assisting nature to clear a way for the lake craft which will soon be coming up and going down. Gangs of men are busy on the railway wharves, getting them put into proper repair while there is a good deal of repair work going on in connection with tugs and barges that have been laid up for the winter.

St. Johns, Nf'd.:—The engineers of the sealing fleet who were threatening to hold up the sailing of the seal fishing vessels, have come to an arrangement with the owners. Nine vessels will go to the fisheries this season, with crews totalling 1,300 men. The only firm which acted independently of the engineer's association were Bowring Brothers, who made arrangements to staff their boats as soon as the trouble devel oped. Aerial observation of the seal herds will be made by Major Sidney Crofton, who is now on an air trip to Labrador, but will be back in time to lend his aid to the fishing fleet.

London:—The first of a new type of lifeboat has been placed on the station at New Brighton, England, at the mouth of the Mersey. The boat, which is of a design got out by the British Lifeboat Institution is 60 feet long, and fitted with motor engines. She can carry 150 passengers, and has a cabin heated, which can accommodate 50 passengers. The boat, which is of course designed for facing the heavy seas that run over the sand banks at the mouth of the Liverpool river, has a speed of ten knots, which they can maintain in moderately bad weather. In very heavy weather the speed will be of course arranged so as to make the going as easy as possible.

London:—The death is announced at Grimsby of Mr. Charles Frederick Carter, at the age of 79. Mr. Carter gave up a draper's business about 60 years ago, to found the Grimsby Coal, Salt and Tanning Co., Ltd., for the purpose of supplying fishing boats with salt, tanned sails, and coal. From a small beginning it has grown into the largest concern connected with the deep sea fisheries, and has extended its business to cover every kind of fishing supplies, so that to-day it stocks everything from a fish hook to a completely equipped steam trawler.

Quebec:—The harbor commissioners of this port, represented by Mr. Power and Mr. Jules Gauvin, commissioners, visited Ottawa to interview the Federal Government with a view to getting aid to carry out the urgent work on the Louise Docks. They stated on their return that they had been very courteously received by the Minister, who explained to them that the Government had not yet completed their organization, and until this was done could not commit itself to public expenditures. The commission then asked the Minister for immediate monetary assistance, which he promised to consider. The president of he Harbor Commission, Mr. Power, said that they were well satisfied with the result of their visit, and expected that in due course the Government would give fair play to Quebec as they had done to other ports.

New York:—Adam E. Cornelius, representing the steamship owners of the Great Lakes, has issued a statement contradicting the propaganda of the proponents of the Great Lake Waterway scheme, which gives the impression that there is a large export tonnage from lake ports available for handling by ocean vessels, which can handle it more cheaply. Mr. Cornelius states that the eastbound and westbound lake traffic in the eight months of navigation has been as high as 100,000,000 tons. Of this total, however, 60,000,000 tons is iron ore shipped from the upper lakes to lake Erie ports, while thirty million tons of coal are carried back from Lake Erie ports to the upper lake ports. Of the remaining 10,000,000 tons, 5,000,000 is for domestic consumption, and only 5,000,000 or 5 per cent. of the total is intended for ocean shipping. The lake freighter can handle this cargo much cheaper than the ocean going ship could possibly do.

On Thursday, 2nd March, 1922, Sir Raylton Dixon & Co., Limited, launched from their Cleveland Dockyard, Middlesbrough, the large steel screw steamer "P. L. M. 27," which they are building for the Paris-Lyons and Mediterranean Railway Company, Paris, whose shipping business is managed by their subsidiary Company, La Societe Nationale d'Affretements.

The steamer is a single deck vessel of the Harroway Dixon Cantilever Framed type with top-side water-ballast tanks, her principal dimensions being 400 ft. x 56 ft. x 31 ft. moulded, and she has a deadweight carrying capacity of about 8,900 tons on a light draft of water. She is being built under special survey to receive Lloyd's highest classification, also to meet the requirements of French Law.

The hull and machinery are being constructed under the superintendence of Monsieur Marechal and Captain Veyrat of La Societe Nationale d'Affretements and Mr. Reginald J. Eyres of Messrs. Eyres & Bryers, Newcastle-on-Tyne, Sunderland and Marseilles.

BRITISH SHIPBUILDING

The services of Ellerman's Wilson Line are numerous, running directly from Hull to various ports in North and South Europe, also to Egypt and India. The fleet consists of about 60 steamships and has just been increased by the delivery of the S. S. Cito. This is a steel coasting steamship built by Messrs. Swan, Hunter, & Wigham Richardson, Ltd., at Southwick on Wear, and engined at their Neptune Works, Walker, Newcastle-on-Tyne. The Cito is of the well-deck type and has been built to Lloyds highest class. Her length between perpendiculars is 173 ft. 6 ins., her extreme breadth 28 ft. 1½ ins. and moulded depth 14 ft.

There is one cargo hold forward and one aft, each served by large hatchways and two steel derricks. The ship's deadweight carrying capacity is 900 tons. Accommodation is provided in a deckhouse amidships for the captain and mates. Underneath this house, at the fore end of the bridge, is the saloon, the engineers' messroom, and also cabins for the engineers, stewards and apprentices. The seamen and firemen are berthed in the forecastle.

The triple expansion single screw engines have cylinders 13½, 22, and 36 inches in diameter respectively with a stroke of 30 inches. Steam is supplied by a cylindrical boiler with a working pressure of 180 lbs. to the square inch.

On the 23rd February the Cito ran her trials at sea off the mouth of the River Tyne to the satisfaction of all concerned. On the measured mile a speed of 9.63 knots was attained. The owners were represented by Mr. W. Sims, the manager of their Coasting Department; Mr. Elliss, engineering superintendent, and Captain Barron. After the trials the Cito returned to the Tyne and went to Newcastle to load cargo for her maiden voyage.

The dry dock, ship building and repair plants owned and controlled by the Grand Trunk Pacific Railway, have been taken over by the Canadian Government. The apparent intention is to operate them in connection with the Grand Trunk Pacific Railway and the Grand Trunk Pacific Steamship Company, both of which are now under control of the Canadian National Railway. Prince Rupert, B. C. is to be made a terminal point. The ship repair plant is as complete as any on the Pacific Coast and includes a machine shop, two covered shipbuilding sheds, a foundry, blacksmith shop and power house. The ship-building plant is equipped with two ways, of sufficient size to permit construction of large vessels.

The Midland Engine Works, manufacturers of steering engines and gasoline marine motors, are adding to their line a marine motor of the Scripps type. For the present, they will build them in four cylinder size, 25 to 40 horse power adaptable to cruiser types of boat from 35 to 40 feet or for speed boats 20 to 25 feet length. J. Bruce Hanly, the manager, who is an authority on motor and water boat construction, states that for a wide range of purposes this type of engine appears to him as one of the most uniform in his experience. In time he hopes to develop three sizes, two, four and six cylinder. His plans are to have 25 ready for the early summer demand.

BOOK REVIEW.

We have received from the U. P. C. Book Company, 249 West 39th Street, New York, "Burning Liquid Fuel," by William Newton Best, F. R. S. A., A. S. M. E., etc. The book contains a foreword by Rear Admiral John R. Edwards, U. S. N., in which he calls attention to the peculiar fitness of the author to deal with this subject. There is also a preface by the author.

The first chapter is devoted to the author's early experience in the use of oil fuel, which goes back to the time of his superintendency of the Los Angeles Electric Railway in 1887. Since those days Mr. Best has equipped practically every form of furnace in existence with oil fuel burning apparatus, and therefore is well qualified to speak on the results attained and to be acquainted with different installations. The origin production and analysis of liquid fuel are dealt with in chapter two, and this chapter contains a fund of information on these departments of the subject. Atomisation, oil systems, locomotive equipment and marine and stationary boiler equipments are dealt with in subsequent chapters. Refractory materials for use with oil furnaces, commercial gas practice, heat treatment furnaces, forge shop, sugar industry, etc., are dealt with very fully.

A feature of the book is the profusion and excellence of the illustrations. The volume fills a very long felt want, and is the most complete treatise on this subject that has come to our knowledge. The book sells for $5 net in the United States.

The Wallace Shipyard, Vancouver, B. C., was awarded the contract for the remodelling of the steamer Admiral Farragut, the company being the lowest bidder at a price of $63,250. The work will last 60 days.

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Taking a High Hand

AN INTERESTING case is going on now in the United States courts in the matter of the schooner "Grace and Ruby," which was seized outside of the three mile limit by the United States customs authorities. The seizure was made on the ground that the vessel was landing merchandise illegally. What actually happened was this. The schooner, which had a cargo of liquor, (for which there is a surprising demand in prohibition countries,) was outside of the three mile limit. She was transferring her cargo to lighters, and had discharged about $100,000 of her cargo before she was captured. The grounding of one of the lighters was the primary cause of the case as the liquor contained in her was seized, and subsequently the schooner herself.

The British Embassy has lodged a firm protest against the seizing of a British vessel by the customs authorities of a foreign power on the high seas, and outside of territorial waters. While the Embassy is entirely willing to let the case go through the U. S. courts, they make the formal protest to protect themselves against the imputation of having condoned the seizure. It is a remarkable thing, and one which on the whole augurs well for the peace of the world, that such an event can occur, and attract so little attention on the part of the people of the injured nation. We venture to state that had such an incident occurred during the days of Lord Palmerston's ministry, that speedy action would have been taken to vindicate British rights. As it is, the British Embassy shows its good sense in allowing what is the high-handed action of an over zealous customs official to be judged on its merits in the courts of his own country. There is, of course, always the temptation for a Government employee of a country, whose people enjoy the spectacular, to give them a little of it, especially when he thinks it can be done without any serious harm ensuing. In the case of Great Britain, there is not much danger.

We wonder what would be the effect on the press and public of the United States if the British were to seize an American vessel on the high seas. The screams of the outraged eagle would be heard round the habitable globe, and the Irish American press would have to design new type fonts to carry the heading in large enough letters, we fear. However, there is the comfortable knowledge that the customs and naval officers of Great Britain have too many centuries' experience behind them to allow of them making a false step of that kind. There is the still further feeling that there will never be any occasion for such methods on the part of vessels carrying potable liquors to the free shores of Great Britain.

Forty Miles An Hour

IN ONTARIO, from where so many fresh water mariners hail, they have been discussing matters of a nautical nature, or rather the Prime Minister has. It appears that Sir Adam Beck, who enjoys a position of considerable prominence in Hydro electric circles in the banner province, has mooted the possibility of maintaining a sort of super-steamer service. This service was to be a link in a chain of railroads and would be composed of steamers with the modest speed of forty miles per hour. The premier, in referring to this service, commented on it in the vernacular, to the extent of saying "some boat." One of the Toronto newspapers, which enjoys a reputation for piety and partisanship, immediately rushed to the defence of Sir Adam's visionary steamer, resenting the premier's implied criticism. It pointed out that there was nothing impossible in the fact of a steamer making forty miles an hour, and in order to substantiate its claim, quoted the cases of British torpedo boats that maintained a speed of thirty-five knots an hour for long periods. The paper in question is quite right. There is nothing impossible in building a steamer to go 40 miles an hour. It is quite right also that British torpedo boats can keep up a speed of 35 knots an hour for a long period, though what this has to do with the performance of a passenger boat we do not know. What is impossible is to run a steamer across Lake Ontario at a speed of 40 miles an hour, and at the same time make her a paying proposition. If fares were charged high enough to do this they would effectually keep anyone from using her. If Sir Adam Beck or the daily press which rush so readily to his aid understood the effect of speed on coal consumption, they would not talk so easily of 40-mile an hour passenger steamers. The famous cross channel vessels of the British Isles do not make any attempt at these kinds of speeds, because their owners are interested in making a little money out of their operation. Of course, where a vessel is owned by the public it is not supposed to matter whether she is a profitable vessel or otherwise, and especially in Ontario. In the banner province the words "Public Ownership" have a magic spell which covers any multitude of commercial sins.

Our New Name

AS ANNOUNCED on our first page, we are with this issue changing the name and character of this journal, in order to serve the interests of the shipping community as well as the marine engineering industry. While the actual operations as far as lake and river navigation is concerned, are seasonal, our eastern and western coasts have an all the year round season, and shipbrokers, ship supply houses, marine insurance, and repair yards on these coasts are always busy. We believe that an organ devoted to these interests can find sufficient support to make it a possibility commercially, whereas a purely technical journal has not a sufficiently large field to appeal to. Our aim will be to give all the news that is of interest in the shipping field, and personal news of those prominent in it, and to make this paper a monthly review of the outstanding events connected with ship operation, harbor improvements and the personalities connected with them.

We look to our readers for helpful suggestion and criticism, and will be glad to give publicity to news of general interest to the shipping community which may be communicated to us by individuals or firms connected with it.

We have correspondents at several of the principal ports, and will soon be represented at all the points on coasts and lakes where shipping is the paramount interest. We have so far secured the services of correspondents in British Columbia, Newfoundland, Quebec and the Maritimes, and thus have ensured that news published here will not be sectional, but Dominion wide.

Compounding the Combustion Engine

After Years of Research a Compound Type of Internal Combustion Engine Has Been Developed and Has Been Subjected to Long and Continuous Runs—The Engine is Four Cycle

By Elmer A. Sperry
President The Sperry Gyroscope Company, M.A.S.M.E. Paper Read Before The American Society of Mechanical Engineers.

THE high-compression or Diesel cycle in combustion engines has worked nothing short of a revolution, having brought to the prime mover its choicest heritage, the highest thermodynamic efficiency known. The fuel economies of these engines have forced them to the front. They have become extremely reliable and easy to operate; instances are becoming common of long runs without overhaul—long-continued performance without shutdown or forced stop of any kind.

As experience is gained with these engines however, there have developed some objectionable features which are serious. Though they occupy somewhat less space than boilers and engines, the weights of Diesels are on a par with, if not somewhat in excess of, those of reciprocating engines with their boilers and decidedly in excess of those of water-tube boilers and turbines. The standard product of the largest builder of Diesel engines for the merchant service weighs about 450 lb. per shaft horsepower and is large and bulky. A substantial increase in tonnage of freight carried is only one of the gains that would be secured, could these engines be made much lighter and smaller for the same power.

The weight is not the only difficulty with these large engines, however, for they cost more than steam equipment of equal power. One instance of $200,000 excess for a 3,500-s. h. p. ship is cited. In another ship for the same service and of the same power the weight was 60 per cent. in excess of the turbine equipment and the cost 212 per cent. amounting to $306,000 excess. Notwithstanding this extra capital charge, the first ship at three-fourths capacity in the Far East trade can earn nearly double net (83 per cent.) over its turbine competitor of the same power and construction and with its machinery weighing a third more than steam equipment.

Again, it has been found that almost without exception a grade of fuel oil known as Diesel oil must be employed. This is a partially refined product costing upon the present market considerably more than bunker oil burned under the boilers.

The fuel-oil problem in itself renders some advance absolutely imperative. Conservation of our oil should be backed by Government enforcement to stop the prodigal waste which results from bulk or furnace firing of enormous quantities of these highly concentrated fuels, destroying three to five times the quantity, power for power, required by steam, especially now since the cheapest petroleum can yield to the full its wonderful store of energy in the most direct way possible by being burned drop by drop directly in the cylinder and practically at the point where the work is to be done.

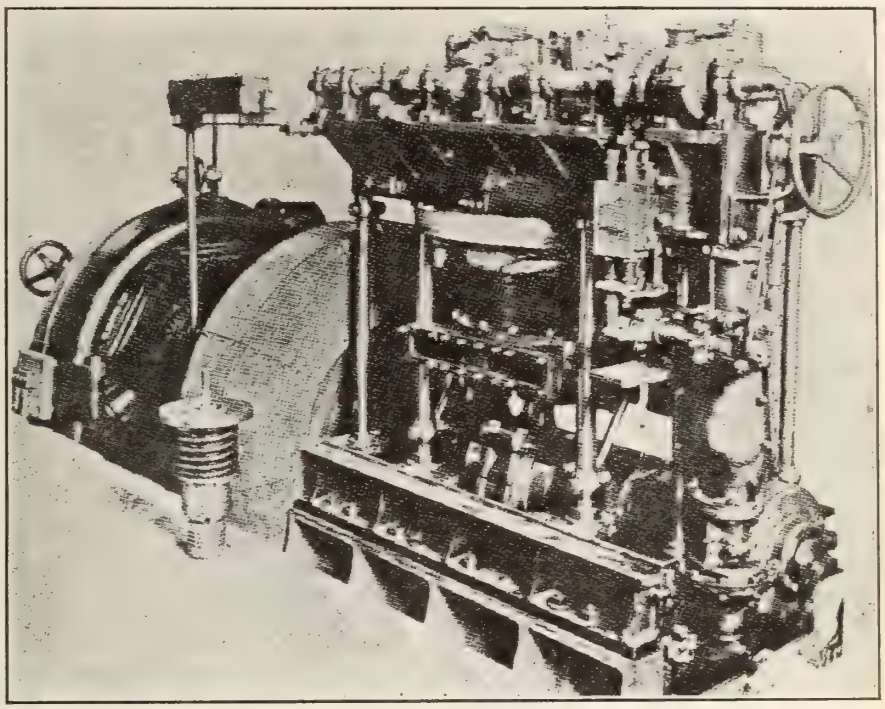

Fig. 1.—10 to 1 compound oil engine built for heavy duty.

Compounding as a Remedy For Inherent Difficulties With Diesels—The Author's Early Work.

In a report made by a group of engineers in 1900, it was stated that if the combustion engine could be successfully compounded, a most important gain would be made in its weight and size. The fact that compounding presents other advantages has been known to engineers for a number of years, but the difficulties have been looked upon as insurmountable.

A year ago Professor Watkinson, director of the important engineering laboratories of Liverpool University, in discussing an epoch-making paper by Engineer-Commander Hawkes on the Admiralty's extensive research on Diesels, stated, in substance, that we must recognize that the combustion engine in its present state was very crude and in compounding only lies the line along which the next great step in progress would be made. And he also stated that much greater results are bound to follow the compounding of combustion engines than were ever realized by compounding steam engines; first, because of the very much greater range of pressures available, and secondly, because the great enemy to compounding in steam, viz., condensation, is not present.

Activity in this field is now prodigious and workers in various parts of the world are commencing to realize that a great advance step is imminent. In America, a group headed by the author has been engaged on this problem for upward of thirty years. Starting in 1890, his first compound was running before the World's Fair. The patent records give evidence of this early work under date of December 10, 1892. A number of engines have steadily followed each other, each involving improvements resulting from previous experience, until the essential problems have been conquered. Not only has the principle been thoroughly established, but all the important refinements have been subjected to long continuous runs. Data almost invaluable to the art have been secured, together with a series of indicator cards and diagrams that exceed a thousand in number.

The outcome has been that the various prophecies of thoughtful engineers in the past have been more than fulfilled and there is every evidence that the heavy-duty compound combustion engine is everything that was hoped for. It is light compared with the normal

Diesel, being in special cases less than one-tenth, and in some instances less than one-twentieth, in weight for the same output. Its mechanical efficiency is extremely high and a distinct gain in overall efficiency from fuel to shaft has been made, as well as a very definite gain in simplicity, direct performance and smoothness of the crankshaft diagram. This has been achieved while adhering to the best practice, namely, four-cycle operation.

Compounds Lighter and Cheaper—Much Larger Units Possible

The lightness and simplicity of the compound solves the capital-charge factor automatically. Engines of this type weighing only a fraction of the weight of the present Diesel will inevitably be found to be much less in first cost as well as in cost of upkeep.

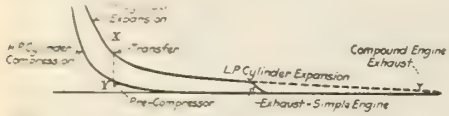

Fig. 2.—Indicator card of compound Diesel Engine.

Much higher powers than are now available are thought to be of extreme importance and much interest is centered upon the question; in fact, the more advanced among the Diesel builders are to-day concentrating upon ways and means to attain still higher powers from a single cylinder working on its present cycle. Of course this will increase instead of decrease the weight per horsepower. It is to the compound that we must look for a solution of this problem, for the reason that within present cylinder and cylinder-wall limitations, powers in excess of 10,000 h.p. per engine are entirely practicable and are accompanied by all the proportionate savings in weight, space and capital charge that have been pointed out.

Our own Government has watched the progress of this work for a number of years, inspected the development in its various stages, and has come forward with orders for an initial engine which, together with orders from other sources, is now under construction. To illustrate to what low figures the compound principle can be relied upon to bring the heavy-oil engine, it should be stated that among these orders is one now under construction to weigh about five pounds to the brake horsepower. This may be looked upon as extreme, but the designed weights and finished parts as they now stand are below this figure. This brings us within striking distance of aviation engines, where the fire risk through the presence of gasoline and the electric ignition system constitutes one of the greatest menaces to aviation progress. The remarkably high mean effective pressures of the heavy-oil compound will give us the aviation engine and entirely eliminate both these sources of fire risk.

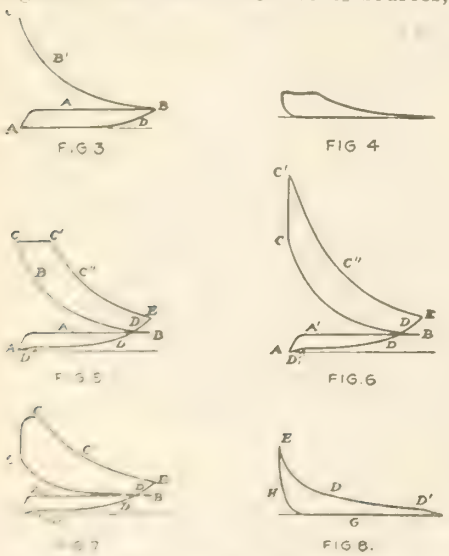

Fig. 3 to 8.—Indicator cards of compound cycle.

The reason for the great weight in all classes of Diesel engines is apparent when it is understood that they are designed around an extremely small quantity of air and oxygen at each stroke, an amount so minute as to be quite surprising when compared to the ponderous engine itself. The volume of the power gases available to do the work is limited to the size of the combustion space, and when it is remembered that this is confined to a small crevice in the end of the cylinder of the order of one-twentieth of the travel of the piston, the limitation is at once seen. Attempts to make it larger produce both compression and ignition temperatures that are too low and we have semi-Diesel and surface-ignition engines confined to smaller sizes with tendencies to a lower grade of performance. Such engines are difficult to start and represent no gain in weight.

Two of these volumes are sometimes combined as in the opposed-piston Junkers engine. The size of the combustion space, though still minute, is known to give some small advantages over the regular engine which has only one-half of this space, but has the disadvantage in common with all two-cycle engines of the fractional piston-ring support practically without lubrication on the hot bridges as the exhaust port is uncovered by the piston.

Separate Cylinders Suited to Pressure Ranges—Two Stage Compression Secures Large Working Volumes

Take, for instance, the Diesel indicator card, Fig 2. Draw the vertical line XY and it is easy to see that the expansion pressures to the left are high and should do their work in a high-pressure cylinder, whereas those to the right, especially following the dotted extension line of expansion, are definitely low pressures and should do their work in a low pressure cylinder for the purpose. This is practically all that is attempted in compounding combustion engines. The vertical line XY also divides the compression curve into two stages, low and high, the latter taking place in the combustion cylinder proper as a second stage. No compressor delivering 500 or more pounds per square inch will undertake to do so in a single stage; there would be at least two stages. The old single-stage compression is discarded in the compound and this modern method of two-stage compression is adopted.

Supercharging or compressing in two stages gives the controlling advantage in that a very much larger unit volume of gases may be handled. The clearance spaces may be many times the size of those in the Diesel, and yet it is perfectly simple to bring these large volumes up to the requisite pressure and incandescent temperatures at the instant of fuel injection.

The large volume of power gases in the combustion chamber of the compound at once solves a number of important problems, makes the light engine easy of accomplishment, and overcomes a number of other difficulties at the same time. No longer is the chilled perimeter per unit volume of gas the controlling factor, as it is in the Diesel. The chilled walls are retired into the background as the large volume asserts itself, as compared with the small crevice indicating the total volume available in the normal Diesel (shown at C in Fig. 9), where the chilled areas exposed are very large and the volume very small. At a glance it will be seen that all this is reversed completely in the large dome-shaped clearance space D in Fig. 9, where the volume has increased very much more rapidly than the perimeter. This is again vastly increased in the low-pressure cylinder, where an extremely large volume exists with still smaller ratio of chilled perimeter. Taking all of the chambers into consideration, it is found that while retaining all of the chilled walls that are necessary for proper handling of the lubrication, still a gain is made on the order of 60 per cent. in the extent of these chilled walls in the compound as compared with the simple engine.

With the large clearance volume we no longer have difficulty with solid injection, nor do we have any difficulty in using a wide range of heavy fuels. It has been known for years that as soon as the oil spray encounters chilled or even red-hot walls, the efficiency drops. Here the oil fog may penetrate the deep masses of hot compressed air with instantaneous effect in every direction from the spray nozzle without encountering chilled walls and instantaneous and very complete combustion results. In the compound engine the clearance volume is so large that the entire high-pressure piston displacement causes it to lose only a fraction of its pressure, thus bringing to the second stage, or low-pressure, both ample volume and pressure so that this piston (representing 6, 8 or even 10 times the area of the high-pressure) is driven to the end of its stroke with pressures still above the atmosphere.

Much Greater Expansion, Higher Efficiencies

In this way the engine yields an expansion ratio based on gage pressures,

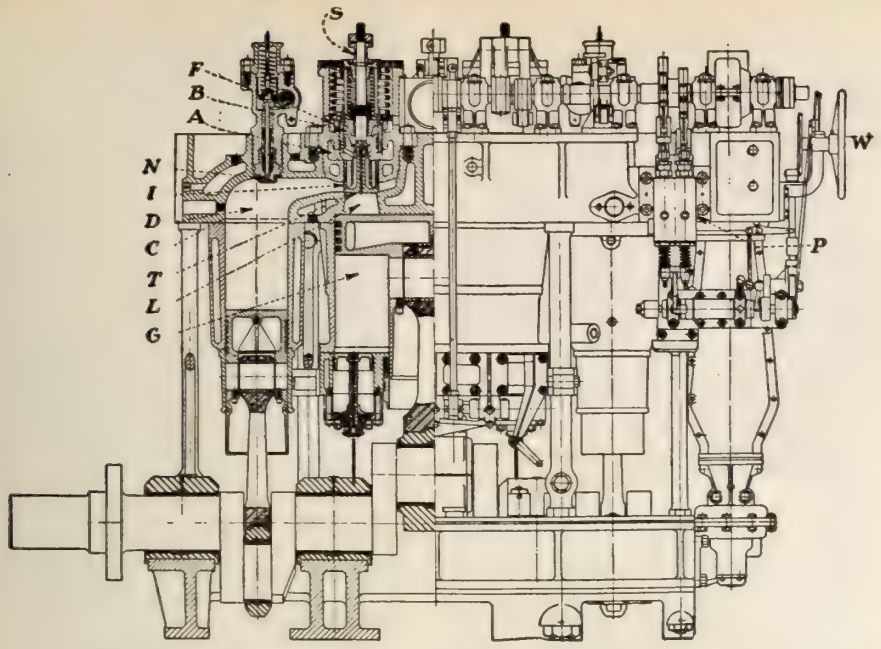

Fig. 9.—Section and elevation of compound oil engine showing construction.

which instead of being 3 or 4 to 1, as in the case of the automobile engine, are made as high as 120 to 1, yielding a higher return and greater efficiency from the fuel because of the lower temperature of the exhaust. The great volume in the combustion space furthermore allows this space, without distortion, to extend easily out over the top of the low-pressure piston, making a most direct connection therewith through the short transfer port (see L, Fig. 9).

Fig. 3 shows the cycle card without fuel, taken from the high-pressure cylinder in a 10: 1 compound. The first-stage compression enters the cylinder at point A on its out stroke with the pressure about 113 lb., giving a power stroke indicated by line A. At point B the induction valve closes and on the in stroke the compression proper starts and rises on line B′ to Diesel values at C. There being no fuel injection, the receding stroke brings the pressure down on practically the same line B′ to point B (E in Figs. 5 and 6). Here the transfer valve opens and the gases pass on the in stroke to the low-pressure cylinder on line D. This is the out stroke of the low-pressure, the pressures sinking to a trifle below atmosphere before the final exhaust valve opens and continues open nearly during the entire next stroke of the low-pressure piston, which is, however, never shown on this high-pressure card but on the low-pressure card, Fig. 8.

Fig. 4 is the air-pump card representing the first stage of the compressor which delivers air to a small receiver, from which air is delivered during the induction stroke, on line A′ of Fig. 3, which, it will be observed, is a power stroke with a high mean effective pressure, thus recovering some of the power of the pump.

Fig. 5 is the same as Fig. 3, except that fuel has been injected, and shows the regular slow Diesel burning common to all early cards of these compounds where from point C a perfectly level line is often drawn to point C″ which marks the point of "cut-off." The gases then expand on line C″ to point E, where the transfer valve opens and the gases continue to do work on a large area of the low-pressure piston, indicated by line D. The exhaust valve opens with pressures only slightly above atmosphere at point D′. The ordinary slow Diesel burning has the objection of lower efficiencies and allowing the heat to be added to the gases out nearer the exhaust end of the stroke.

Utilizing the Detonation of Fuels

Through a research extending over a year and a half or more, conditions were discovered by means of which "detonation" of the fuels may invariably be secured. This extends to a large variety, including of course the heavy fuels. While automotive engineers have adopted extreme measures, even lowering compression, "doping" fuels, etc., etc., in order to avoid the detonation, we have been working in the opposite direction. We have found that the thermodynamic efficiency is higher in case of high detonation diagrams than with low. Our work has been toward realizing these high efficiencies by developing instead of suppressing this high-intensity combustion. We have therefore sought to harness and utilize to the full the detonation phenomenon for the reasons and with the results outlined herein.

Fig. 6 is a typical card taken under the same conditions and the same engine as Figs. 3 and 5, exhibiting "detonation" and showing the quick burning, piling the heat up at the beginning of the stroke and as far away as possible from the exhaust end, giving also a very much truer Carnot-cycle card. All recent running of the compound engines has been in accordance with this card. One of the achievements of high-intensity combustion is better thermal efficiency and a still further reduction in the exhaust temperatures. The engine with this type of card is lifted from the old constant-pressure to the superior con-

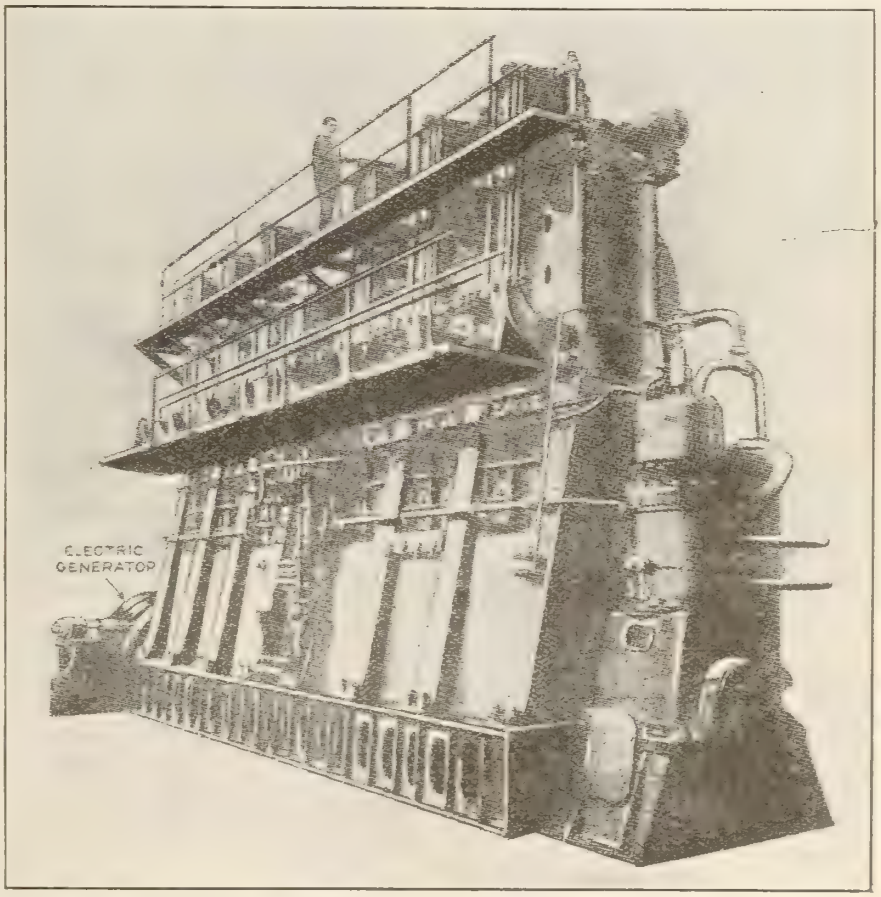

Fig. 10.—Standard type marine Diesel.

stant-volume performance which frees the compound from all speed limitations. The detonation characteristics, e.g., the vertical rise on the diagram, persist even at very high speeds. This card also insures operation at lower fractional powers without indication of carbon deposits.

Fig. 7 is given as showing the range of control of the peak and shape of the card at will under the same operating conditions and with the same spray nozzle.

Elimination of Losses in Transfer

In early attempts at compounding, principally layouts, it was found that prohibitive losses would occur in the transfer, due to the falling pressures while filling the low-pressure clearances. A complete solution of this is found in a special adaptation of the process of "cushioning"—closing the exhaust valve at a predetermined point before the outgases and cushioning them up to the transfer pressure so the transfer valve opens under conditions of equal pressure on each side. There are practically no losses sustained in cushioning; the power of compression is returned very completely on expansion. The additional advantage is secured of preventing all erosion due to high velocities of the hot gases over the transfer seats. These seats are amply jacketed and are found to remain smooth, bright and perfectly sealed over long periods. It is incidentally found that in cushioning, the adiabatic compression of the hot gases brings with it an equality of temperatures as well as pressures, so there is neither loss in pressure nor temperature at this critical point of transfer and the efficiencies are carried at high values throughout the cycle.

Fig. 8 shows the low-pressure card, indicating the same power pressure line D as Figs. 3, 5 and 6. On this in stroke the exhaust valve opens at D′ and closes again at point G on the out stroke, giving rise to the cushioning curve H, terminating at the same pressure and really the same temperature as at E in the high-pressure cylinder.

The Transfer-Valve Problem

The point X in Fig. 2 will be recognized as being the same as point B in Fig. 3 and point E in Figs. 5 and 6. The transfer valve considered as an exhaust valve is here called upon to handle much hotter gases than ever heretofore. It must be remembered, however, that compression in the compound is by the modern two-stage method. Air is admitted to the combustion chamber under comparatively high pressure and although it is warm, yet with each atmosphere of pressure its cooling powers are doubled. Air at 100 lb. thus has seven times the cooling power of atmospheric air, seven times the weight and seven times the molecules in contact for cooling. In forcing the high-pressure piston down on pressure line A′ in the above figures, air must pass some port in entering. Now, as a matter of fact, this port is in line with the transfer port and the induction valve itself rides on the back of the transfer valve in the form of a hollow sleeve I (Fig. 9) seated directly on the top of the transfer valve T. The back of the transfer valve is provided with greatly enlarged radiating and cooling surfaces presented to this cooling air and powerful convection currents are constantly acting when sealed. Moreover, this air when entering is at high velocity and gushes down through and bathes the deeply serrated surfaces of the back of the transfer valve, licking up the heat very completely in its inward rush.

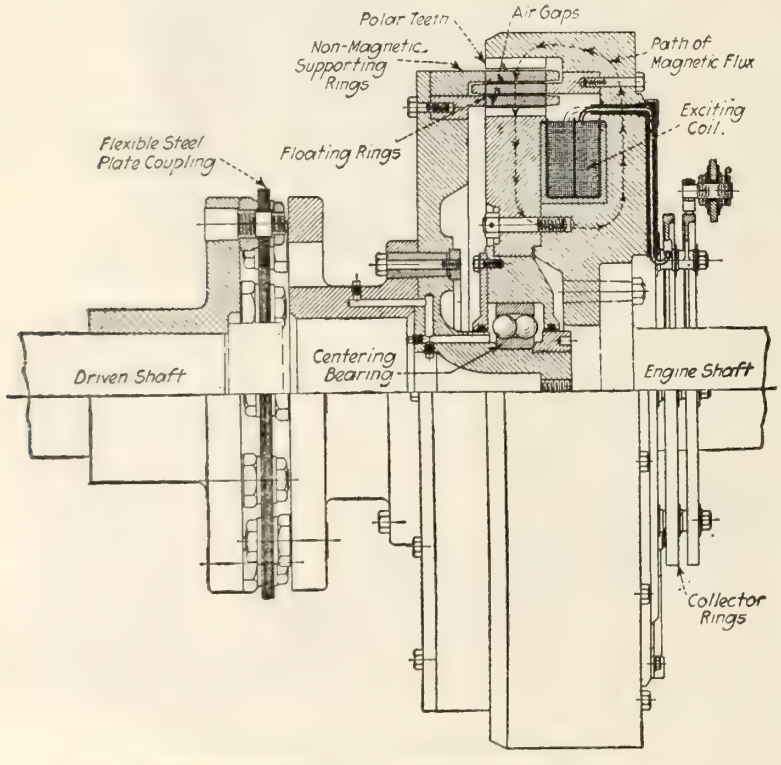

Fig. 11.—Air gap type of electro magnetic clutch.

Now in following out the cycle, it will be noticed that this is the very step that follows directly on the heels of the transfer of the hot gases (D, Fig. 3) and continues throughout the next quarter cycle (see A′ Fig. 3) and through the entire descent of the high-pressure piston, which in this way delivers a real power stroke to the crank with mean effectives in some instances greater than the mean effective pressures of the ordinary Diesel, thus returning some of the power taken to drive the supercharger or first-stage pump. If the transfer valve is intensely heated on its under surface (see T, Fig. 9) and is then instantly intensely cooled on a surface five times as great, it will certainly strike and maintain a heat balance which in practice is found to be extremely low, only about one-half the temperature of the Liberty valves, nowhere nearly approaching red heat nor the temperature of normal Diesel exhaust valves under load conditions.

Again, the heat in these gases absorbed from the hot valve is useful inasmuch as it is the auto-ignition temperatures as well as pressures that are required at the end of the compression curve B′. Here a useful heat transfer and pure regenerative process is carried out. The seats give no trouble because they are backed by the ample water jackets and, in fact, the whole transfer valve gear operates continuously and successfully and is found to be in perfect condition after hundreds and even thousands of hours of operation.

How Lightness is Obtained in the Compound Engine

The question often asked is, to just what is due the smallness and lightness of the compound engine? It is this: In the four-cycle Diesel we have the tonnage of metal due to the presence of high pressures operating at a ridiculously low material efficiency because these high pressures persist only about 2½ per cent. of the total time. The Diesel card rises abruptly and immediately falls. All the rest of the time, over 95 per cent., either low pressures or no pressures at all are present, whereas in the compound the pressures persist and we are dealing with great blocks of power, as can be seen from the power curve C″. Although the pressures are not materially higher than in Diesel practice, they are made to persist practically clear across the card, producing a very large gross mean effective. This is instantly followed by another line clear across the card, again producing another large gross mean effective in the low-pressure cylinder when referred to the high-pressure area, all from a single fuel injection. Instead of 60 to 70 lb. net mean effective to the crank, delivering its power through a few degrees only of one stroke in four, in the compound we have two net mean effectives, each of 300 or 400 lb. sq. in., succeeding each other and covering two strokes out of the four from a single fuel injection, giving very much better crank-effort distribution for power purposes. The

point of paramount interest is that these two large blocks of power are secured not by any material increase of pressures, but by using large quantities of power gases, and "hanging on" to the pressures we have in those gases throughout practically two complete strokes, clear across the card twice, thus abstracting much more of the power they contain before exhausting. Suppose these to be 330 lb. per sq. in. each. Added they make 660, which is easily ten times 62 lb., a net mean effective not infrequently met with in ordinary Diesels. In an engine of simple construction giving ten times the net mean effective to its crankshaft and well distributed, there should be no good reason why it should weigh more than one-tenth the weight of the present Diesel.

The power gases work in the Diesel about 120 deg. of arc and in the compound 315 deg., or 2.6 times as long; or, considering the points of "cut-off" in each, the true expansion curve is 3-1/3 times as long, which accounts for its large mean effectives and higher economies.

Proper Ratio for Compounds

As to the proper ratio for compounds, engine of 10: 1 ratio of low-pressure to high-pressure cylinder areas, also 8: 1 and 6: 1 have been made, operated and studied, the smaller ratios being at present considered more desirable. The weight factor does not change materially with changes in ratio in this region. The low-pressure piston operates two-cycle. The power distribution and the weight of the reciprocating parts both equalize best at about 6: 1. This makes a perfectly balanced unit, the end masses equaling and also moving oppositely to the central. The two full power impulses following each fuel injection are also about equal. Thus full four-cylinder performances are secured with only three cranks and two extra power impulses are delivered on the induction stroke (see line A', Fig. 3), making six power impulses for each cycle.

Another unusual advance shou'd be noted, viz., complete reversibility and self air starting are secured without additional valves or cams over the simple, one-way engine without air starting, there being no difference in this regard. Again comparing the full-reversing, air-starting compound unit with a similar four-cylinder Diesel of any prominent make, delivering the same number of primary power impulses to the crank, the latter has 16 valves and 32 cams. The former operates the same cycle with two extra power impulses over the Diesel with 5 cams driving 7 valves.

Doing away with the three-stage air injection pump, its intercoolers and general complexity is another important simplification. One United States builder stated recently that an excess of 11 per cent. of the entire power of the engine is absorbed for driving these pumps.

Marine Type of Compound Engine

Fig. 1 shows a 10 : 1 compound engine built for heavy duty. Although this is a small marine type with high-pressure cylinders 7 in. by 11 in. running at 400 r.p.m., yet the size of the crank-pitman end in the lower center of the engine reveals the ruggedness of these parts. The fuel pumps are also shown here and the connection to the governor. The camshaft is on a shelf at the top of the engine to one side and is driven by skew gears. The electric generator forming the full load of this engine is shown in the background and one of the transfer valves with its bonnet cover stands on comparatively small size of the engine, although in the foreground, is notable and stands out in marked contrast with the engine of Fig 10, the product of the largest Diesel builder. This is the standard marine engine for some seventy ships. The electric generator forming the full load of this engine (so marked) is also in the background, as in Fig. 1. The generators in the two cases of course being standard, give an unusually excellent basis of comparison. The compound works at a piston speed of about 700 feet per minute and its generator would be still smaller in comparison, should it be worked at the piston speed of about 900 feet per minute of the large engine. Incidentally, in the foreground of Fig. 10 there is also an excellent illustration of the three-stage, intercooled, high-compression air pump for spraying the fuel into the cylinders.

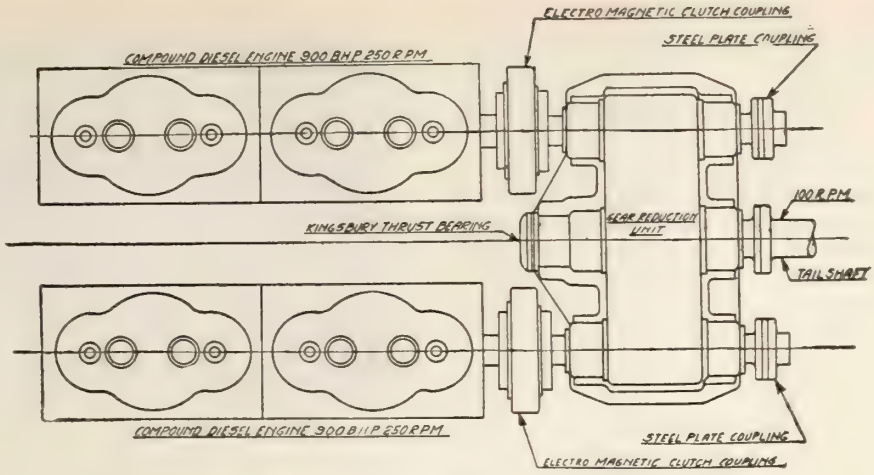

Fig. 12.—Plan of proposed installation of propelling machinery.

The large size and weight in the Diesels extends to all makes in somewhat different degrees. A line of Diesels made in the United States are reported to weigh 512 lb. per b.hp. The engine of Fig. 10 weighs 450 lb. per b.hp., while the compound in Fig. 1 weighs less than 30 lb. per b.hp.

Internal Construction of the Compound

Now as to the construction of the compound, Fig. 9 shows an elevation to the right of the center, and longitudinal section to the left, of the engine shown in Fig. 1. The two high-pressure or combustion pistons on their out stroke are at the ends and in the center the low-pressure at its extreme in stroke. The sturdy construction is indicated by the size of the crankshaft, about 50 per cent. larger than in any other combustion engine of which the author has knowledge, approaching, as it does, the bore of the combustion cylinders themselves. The fuel pumps P and the control and manipulating wheel W are shown in elevation to the right. To the left the large dome of clearance D, forming the combustion chamber of the compound, stands out in marked contrast to standard Diesel practice, which is shown by the little space C between the solid horizontal line at the base of the clearance and the dotted horizontal line just above. The dome is large and forms an upward extension of the combustion cylinder, extending also to the right in a large sweep surrounding the transfer valve T which seals the transfer port L. The sleeve-like induction valve I is shown seated on top of the transfer valve and is controlled by the cam-operated fork F. The transfer valve and sleeve are lifted by a fork not shown, located in thimble S near the top of the stem. The first-stage annular compression pump G surrounding the trunk piston below the low-pressure piston proper, delivers its air to a small receiver, which in turn discharges to the cored port A surrounding the induction sleeve I, the cooling action of which has been described. The little balancing cylinder B sustains a permanent connection with the low-pressure cylinder. The solid-fuel injection valve and nozzle N are placed approximately over the center of gravity of the large masses of air in the clearance dome D.

The comparison with the large dome constituting the clearance and combustion space in this compound with the small distance between the solid horizontal line at the base of the combustion space in Fig. 9 and the dotted line indicating the combustion space C in the normal Diesel, is simple to make and is significant.

It is understood that the two high-pressure cylinders are operating four-cycle, one 360 deg. back of the other, discharging alternately into the low-pressure, which therefore works two-cycle and delivers power on each down stroke. The cycle has been pointed out and the general operation will be apparent from this figure.

Field of Usefulness of the New Prime

To engineers versed in the problems of selecting and designing prime movers,

the advantages of the compound combustion engine are readily apparent. Its light weight for a given power with resulting low first cost and capital charge, the low costs for foundations, the high speeds with consequent low costs for connected generators, the small space required and the simplicity and economy of operation are important reasons for suggesting new fields for this prime mover, which has been proven of practical value in a long series of tests under working conditions. The compound engine is especially adapted for use for auxiliary or stand-by service in water-power stations or for carrying the peak loads in central stations where installations are as large as 21,000 kva. have been contemplated. The important considerations are quick starting, non-deterioration of fuel reserve and flexibility of required fuel, amounting to almost complete independence of fuel quality. Other uses for the compound which readily suggest themselves are city water works and irrigation projects, either directly or by electrical distribution.

The possibilities of the compound-Diesel-electric locomotive should not be overlooked, as it presents all the well-recognized advantages of electric traction. At the same time it represents a component part of the central power station, with the advantage over the latter that it operates at the highest thermal efficiencies known—nearly three times the efficiency of even a very large power plant, i.e., three times the tractive effort is delivered to the rail from every pound of fuel burned. Also the capital charges for main feeders, substations, bonded rails and shunted switches and frogs, and the third rail or elaborate overhead construction are eliminated. The tracks are used exactly as they now stand.

Application to Ship Propulsion

We now come to the greatest present employment of oil engines, namely, their substitution for steam in ship propulsion. The advantages of motorships are rapidly being recognized, and they are now being built in practically every maritime country more rapidly than ever before. There were building last year 454,502 tons of Diesel-driven ships, or over 7 per cent. of the world's total under construction. In the light of the past ten years' experience the Diesel engine has proved an efficient, reliable and thoroughly seaworthy prime mover, suitable for a large proportion of the total sea-borne tonnage.

Novel Electromagnetic Clutch Affords Elastic Drive

In connection with the development of the compound engine for marine purposes, and in order to provide any Diesel type of engine with speed flexibility equaling the reciprocating steam engine, there has been developed an electromagnetic clutch operating on an entirely new principle.

This new type of clutch transmits power entirely through air gaps and has no mechanical contact whatever between the driver and driven, eliminating wear and deterioration. It is capable of remote control and can be operated at any speed from zero to full engine speed; the torque may be varied at will from maximum to minimum. The power required to operate the clutch at full load is but a small fraction of one per cent. of the power transmitted. In one instance 525 hp. required 256 watts, or 0.065 per cent of the power transmitted. An outstanding feature of this clutch is that on direct drive or full speed it is magnetically locked, which insures perfect synchronism and no slip with an extreme increase in pull-out torque. At this and all times, in fact, the transmission has the "velvet touch" of an air drive and insures complete torque-wise isolation of the mass moments lying on the two sides of the clutch. As seen in Fig. 11 the clutch forms a part of even a small-sized flywheel of either a Diesel or compound with little, if any, alteration of its mass moment.

The clutch is characterized by two kinds of torque operating by opposite phenomena; the greater the differential or relative velocity between the driver and driven parts, the greater the torque available for starting and for bringing up to synchronism. This phenomenon also provides for slipping and continuous operation at all fractional speeds by means of the loaded secondary effect acting as an induction motor.

The air-gap clutch drives through magnetic flux comprising four ring elements, two of which are driving and two of which are driven. The flywheel proper accommodates an exciting coil producing the magnetic flux. At all fractional speeds or while this clutch is slipping, this magneto induction generates large currents in the driven elements which are now acting as short-circuited secondaries, producing heavy drag torques under perfect control by varying the amount of coil excitation. However, when the speed comes up in the vicinity of synchronism, locking occurs.

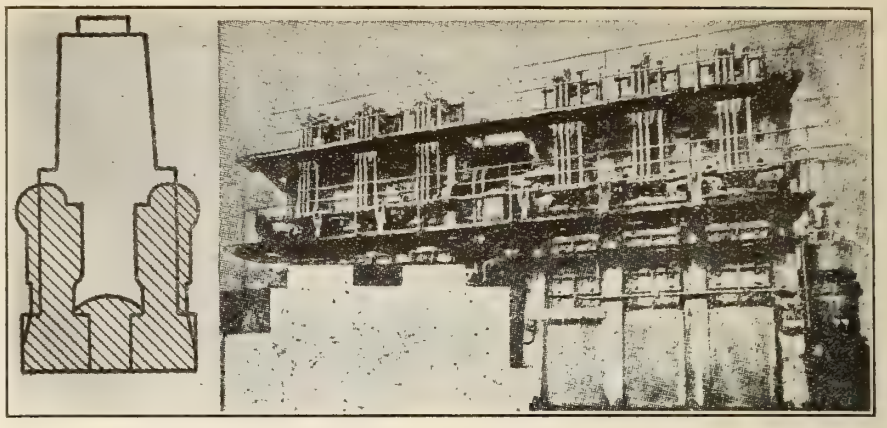

Fig. 13.—Comparison between compound divided unit geared drive and standard Diesel engine delivering to tail shaft and same power and speed.

Proposed Installation of Propelling Machinery

Fig. 12 shows in plan view a proposed installation of the propelling machinery, securing the advantage to both engine and tail shaft of entire freedom of each to run at its own best speed. A propellor for a given ship has a speed at which it gives its most efficient performance; likewise a combustion engine can be built most economically and to give its best performance for a given size if the designer is given entire freedom to choose the best engine speed, a condition which is extremely desirable.

With this clutch and the engine combination shown in Fig. 1 several very important advantages are secured:

(a) There are available on a single propellor all the advantages and flexibility of a multiple engine equipment, where one engine may be shut down and completely disconnected for inspection, valve grinding, etc., and yet the ship be going forward at three-quarters its normal speed.

(b) Complete flexibility of the electric drive without the expense, weight and space of the electric generators and motors and the cumbersome electric control equipment for handling the heavy currents in maneuvering, and the double losses of generators and motors which are of substantial amount and a constant drag on plant and fuel economy.

(c) The simplest form of gear drive may be employed because the magnetic clutch allows the pinion to be a complete "floater." The pinion may thus accommodate itself to any part of precision and all sorts of idiosyncrasies of the main gear and teeth without shock. Any irregularities existing have to deal only with the small masses of the pinion itself and its sub shaft, being completely isolated from the large mass moments of the engine.

(d) The well-known irregularities in torque of any reciprocating engine and circumferential oscillation are entirely smoothed out by the air gap in the clutch and are not permitted to reach the pinion; its specific tooth operation is thus completely safeguarded. The crash and general irregularities of the engine torques thus never reach the pinion and therefore can have no effect on the complete smoothness of its performance.

(e) The torque, being under complete control, can be lowered so as to safe-

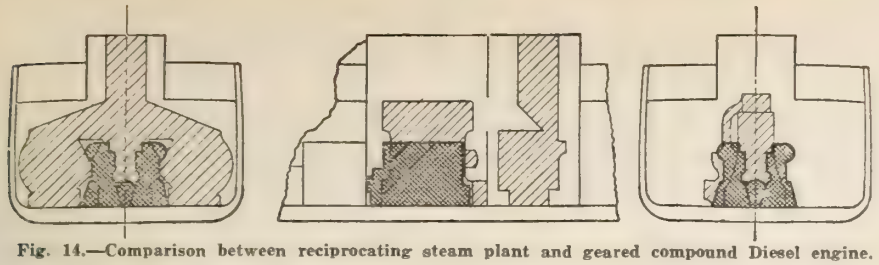

Fig. 14.—Comparison between reciprocating steam plant and geared compound Diesel engine.

guard the equipment against overloading, especially when sailing in obstructed harbors, near derelicts, and where floating obstacles are likely to be encountered by the propeller blades, thus providing an important emergency disconnecting gear breaking away from the large engine masses and allowing the propeller to "stop in its tracks" through the self-interruptibility of the magnetic clutch when reduced to fractional underload condition. In this way many disasters to the propelling machinery and interruptions to the service may be avoided.

(f) Nearly all revolving machinery is subject to periods, sometimes running into severe "criticals." These criticals always develop from the irregularities in torque of the mass moments within the engine pitted against outside mass moments aft. This can occur only when these are solidly coupled with each other, but if instead they are isolated, as by the cushion or air gap of a magnetic clutch of proper design, these troublesome criticals with their excessive stresses are completely suppressed and can never develop.

(g) The combustion engine is reversible and runs equally well in either direction. The magnetic clutch solves completely all maneuvering problems, and in this way stands out in bold contrast to the difficult maneuvering and reversing conditions introduced by the non-reversible turbine.

As seen in Fig. 12, a Kingsbury or equivalent thrust bearing may be located forward of the main gear. The pinions flanking the gear on either side are not necessarily diametrically disposed. This gives an excellent distribution of the machinery, compact engine-room arrangement, and ample space for the small oil-engine generating sets for the ship, which incidentally also supply the clutches with the very trifling amount of energy and any other auxiliaries outboard of the engines. The engines are completely reversing and self-air starting, and either engine may be completely isolated at will. When either engine is running, the other may be gradually or quickly started up by means of the clutch instead of by air, if desired. The engines under this arrangement run with extreme smoothness and under complete control. In one instance the clutch succeeded in suppressing entirely a very serious "critical" which occurred in a 700-hp. submarine type Diesel near the normal running speed.

Saving in Weight and Space over Diesels

In Fig. 13 there is shown in side to the right, the comparison between the compound divided-unit geared drive delivering to the tail shaft the same power and speed as the standard Diesel unit of the largest manufacturer. The divided unit consists of two engines, each with four combustion cylinders, in two compound units. Note each of these engines gives the same turning moments and torque diagram as an eight-cylinder Diesel. In fact, with this divided unit we have eight combustion cylinders in the two engines with less than half of the cams, etc., of a six-cylinder Diesel, with all the advantages of two engines, including immunity from shutdown, possibility of inspection and other operating advantages which are well recognized. These two views serve graphically to give some idea of the saving in weight and space.

To aid in the comparison with the reciprocating steam engine, Fig. 14 has been developed, giving three views of the steam plant in shaded background. Against it there is outlined the standard compound, two-engine, geared magnetic-clutch arrangement for the identical horsepower and speed at the tail shaft.

THE GROWTH OF THE SHIPPING INTERESTS

Continued from page 9

from the Great Lakes to the sea, is another venture that presents possibilities of disaster. We may admit that as a power scheme the project might justify itself, but as a route for ocean vessels, we cannot see how it could ever be successful. The lake freighter can carry grain to the elevators at a cost far below any possible competition from an ocean going ship, and on the other hand is physically constituted so that she cannot make the ocean voyage. The ocean going vessel of any size would incur expenses in threading the narrow inland waterway of such magnitude that the charges necessary to cover them would send her freight rate away up above the present cost of lake steamer carriage and trans-shipment. If the scheme were confined to making the St. Lawrence canals navigable for the large carrying but shallow draught lake boat to Montreal, where she could tranship her cargo direct to steamer or elevator, there would be some possibility of it being made commercially sound, but the idea of large ocean steamers, of deep draught, feeling their careful way through hundreds of miles of canals with barely enough water to float them, with the inevitable delays in locking, is not one that we can conceive would appeal to the owner of the ship. From the healthy opposition shown to the scheme, it is not likely that it will ever get very far.

MENACE TO NAVIGATION

Three Rivers.—On Wednesday afternoon March 15th a conference was held at the offices of the Minister of Marine in the Post Office building in Montreal, and the matter of sulphur gases, with heavy fume mists coupled with smoke at Three Rivers, was discussed. Members of the lighthouse board were present, also representatives of various shipping companies and a score or more of St. Lawrence River pilots. The conference was called because of complaints filed by shipping men and pilots, that the three pulp and paper mills at and around Three Rivers were in the habit of emitting dense fumes which were said to have acted as something more than a smoke screen, and interfered to a dangerous extent with navigation at that point. It was stated that when a change of wind suddenly brought one of these fume screens down on the river, pilots lost sight of the ranges on shore and sometimes could not even see the bows of the vessel that they were piloting. Complaints to the number of thirteen were put in by representatives of the shipping companies and pilots. It was finally considered that the best way to check the nuisance would be to hold a conference of the chemists of the department and the chemists of the pulp and paper companies concerned, and give them the opportunity to devise a method of doing away with the trouble. Col. W. I. Gear put forth this suggestion and it was accepted by both sides. The chair was taken by Mr. B. H. Fraser, Chief Engineer of the Marine Department at Ottawa. Captain G. E. Robertson, of the Lighthouse Board and Director of Pilots, and W. V. Forneret, superintendent of the ship channel, and representatives of the pulp and paper companies interested were also present.

Nothing further was done and if the chemists cannot devise a solution, a further conference will be necessary.

Quebec.—From all reports the ice in the River St. Lawrence between Montreal and Quebec is much heavier this year than last. Early in the month the Government Ice Breaker, Lady Grey, left Quebec on her annual attempt to loosen the ice in the river. Although the steamer has been out nearly three weeks, she was from latest reports still at Port Neuf. She was able to advance to this point a few days after leaving Quebec. There, an impassable barrier of ice was met, which up to the present has resisted all her efforts to dislodge it. Below Port Neuf there is a lot of open water with a great deal of floating ice. The Lady Grey is not expected to reach Montreal much before the middle of April.

Generating Steam By Electricity

Under Certain Conditions it is Possible to Use Electric Power for Steam Generation Purposes. It is Being Done in Some Canadian Plants To-day, and Has Been Used in Europe for Some Years

WHILE there has been in European countries, a considerable use of electric steam generators, the principle has not been very widely used in Canada, or the United States. There are some installations that have been operating for a short time in this country, and these installations together with a description of the general principle were described by Mr. F. T. Kaelin, Chief Engineer of the Shawinigan Water & Power Co., at a recent meeting of the Engineering Institute of Canada.

Advantages

Under prevailing conditions where electric power is sold on a kilowatt hour basis, electric steam generation cannot compete with steam produced by fuel, but it is not beyond the possibility that in some remote places where the cost of fuel and freight are high and the cost of a hydro electric development is low, the electric steam generator with its very low capital investment and operating expenses may become a competitor to the method of generating steam by burning coal or oil, but it is not necessary to consider such an exceptional case to prove that the generator fills well its place permanently as a transformer of idle power into useful heat energy. We may consider its usefulness mainly from two different points of view:

Consumers

1. From the point of view of the consumer of electric power owning a hydro electric installation, or purchasing blocks of firm hydro electric power on a flat rate power contract and using this power for manufacturing purposes only, during a smaller part of the twenty-four hours. In many manufacturing plants steam has to be produced for cooking processes, drying, humidifying, and in all cases heat is required for heating purposes during six months and during the full twenty-four hours. Here we have electric power lying for twenty-four hours and paid for. The thought comes to us, what can be done with this idle power? Is there any cheap way of transforming this electric power into something useful? It is well known that electric energy can be transformed into heat energy at a very high efficiency. One of the cheapest ways of doing this is to produce steam which in most cases can be used in conjunction with other steam generating apparatus, and where a system of piping for the purpose of heating or using steam for manufacturing purposes already exists.

The low cost of the steam generator compared with other electrical apparatus for the conversion of electric energy into heat, and the wiring and control apparatus necessary for such equipment, is very much in favor of the steam generator. It can be shown that even in extreme cases where the load factor is comparatively high, for instance in pulp and paper manufacturing plants using a considerable amount of power during six days of the week and having it idle for the seventh day and at the prevailing cost of hydro electric power purchased in big blocks by these companies that it is economically quite feasible to turn the power which was used during six days, mainly for pulp grinding, during the seventh day into steam which is always required in such places, either for manufacturing or heating purposes. It was shown in an investigation made lately that the saving of coal during the fifty-two Sundays and three holidays would easily pay for the installation of the steam generator in less than one year, and there are no doubt quite a number of pulp and paper plants in this country where similar conditions exist and where a considerable saving could be accomplished.

Power Producing Companies

2. From the point of view of the Power Company producing and selling hydro electric power, the present commercial depression and slowing up of the industrial activities have left hydro electric companies with surplus of power for disposal. How long this condition is going to last is uncertain but there is no doubt that a considerable amount of unused power will be available for the next two or three years. Power companies can afford to sell this power at cheaper rates during such time as there is no other market for the power, though preferably under conditions which allow the power company to cancel the contracts on short notice. But at the same time it must be clearly understood that no power company could afford to develop hydro electric power for the main purpose of generating steam electrically in competition with coal.

The problem has been to find a use for this idle power which would not require any expensive installation, new machinery or additional apparatus, for instance transformers, etc., and as it was out of the question to use the power, for new industries or the manufacture of new products which require considerable power like those produced in the electro-chemical industry, one of the solutions was to turn the electric power into heat in the form of steam which is used to a very great extent in many industries, especially in the pulp and paper industry. To do this, of course, other factors have to be favorable such as the transmission of the power, the proper voltage available that would not mean any further transformation and the low cost of the whole installation for generating steam electrically.

Although some of these installations which are in operation to-day may be considered as quite temporary due to the prevailing exceptional conditions, there is no doubt that in many cases the electric steam generator is going to stay and be used at such times as there is power available from the power companies. This is usually the case during three or four summer months when the water-flow in the river is high and a certain amount of surplus power is available. It may even be feasible to use only night power by close co-operation of the power company with the power user, and the fact that starting and stopping electric steam generators takes only a few minutes. These are all points which make the steam generator a very flexible apparatus and make it very useful to convert electric energy at any time at short notice and at extremely low cost to valuable heat energy.

Efficiency

In the electric steam generator all electric energy is converted into heat energy, the electric current passes through a resistance either of metal or formed by the water to be evaporated. The whole process of conversion is therefore governed by ohmic law. 1 k. w. h. is equivalent to 3,412 B. t. u., the total heat content of 1 lb. of steam at an absolute pressure of 150 lbs. per square inch is 1,139 B. t. u. Assuming feed water temperature of 150° F. the total heat to be supplied will be 1,139—(150-32) = 1,075 B. t. u. 1 K. W. H. will therefore produce

$$\frac{3{,}412}{1075} = 3.17 \text{ lbs. of}$$

steam, no heat loss considered.

The efficiency of the electric steam generator is very high, the only losses are the radiation losses of the apparatus, and the heat losses represented by a certain amount of water discharged from the generator which carries away a certain amount of accumulated impurities in the feed water. By proper lagging and regulation of this discharge water the losses become very small and depending on the size of the generator may be from 1 to 4%—for larger sizes of generators the efficiency can be

taken around 98%. On this basis 1 k. w. h. will produce 3.10 lbs. steam. Under average conditions 1 lb. of soft coal of about 12,000 B. t. u. evaporates about 8 lbs. of water. 1 ton of 2,000 lbs. of coal evaporates 16,000 lbs. of water. The electric energy required to evaporate the same amount of water is equal to

$$\frac{16{,}000}{3.10} = 5{,}161 \text{ KWH.} = 215 \text{ KW}$$

days = .59 k. w. years = .8 h. p. year, or in other words 215 k. w. in an electric steam generator is equal to one ton of coal per day, burned under average conditions of boiler efficiency.

Comparing the capacity of an electric steam generator with the capacity of a regular boiler in boiler horse-power, we find the following relations: One boiler horsepower is defined equivalent as the evaporation of 34½ lbs. of water from and at 212° F. per hour and represents 33,479 H. t. u. per hour, 1 k. w. hour being 3,412 H. t. u. and at an average efficiency of 98% equal to 3,342. These figures are almost exactly in the ratio of 10 to 1, therefore, an electric steam generator of 1,000 k. w. capacity is equal to a boiler of 100 boiler horsepower.

Classes of Electric Steam Generators

Electric steam generators have been built during the last ten years in capacities up to 1,000 k. w., and only in the last two sizes of 2,000 k. w. and more have made their appearance. Steam generators may be divided into two main and distinct classes:

First—Generators in which the electric current passes through a combination of metallic resistors.

Second—Generators in which the water itself forms the electric resistance.

Metallic Resistance

In the first case the metallic resistors in the form of wire and ribbon of some high resistance alloy may be mounted in tubes similar to those in fire tube boilers. The arrangements allow the use of alternating or direct current as heating elements do not come in direct contact with water. In all other cases where the resistors are in contact with water and the current passes partly through metallic resistors and partly through water only alternating current can be used as direct current would decompose water into its elements hydrogen and oxygen. Generators of the metallic resistor type are only suitable for low voltages up to about 500 volts and are therefore not usually adaptable for very large outputs. The steam production is controlled by switching on and off of a number of parallel circuits and the combination of such circuits in parallel or series connection. To maintain a constant steam pressure requires, therefore, rather complicated and expensive electric control equipment. Generators of this type have been built of 1 500 k. w. capacity, being of the tubular type construction, about 20 ft. long and 5 ft. 6 inches in diameter. The space occupied by this type of generator is comparatively large compared with the steam generating capacity.

Water Resistance Type

The second class of generators which will be mainly dealt with in this paper are built on a principle quite different from the metallic resistor units. The electric current passes through steam tight insulating bushings to a system of stationary electrodes partly submerged in water, the water to be evaporated serves as the electric resistance. This type of generator is known as the "Revel Generator" and has been in use principally in Italy, Switzerland and France for the last ten years, mostly in self-contained units up to about 700 k.w. For any considerable amount of electric power only a three phase alternating current system may be considered as practical to-day. For small units and of voltages up to about 2,200 volts, the container itself forms the neutral point of the three phase system and is grounded. For larger capacity generators, especially when the voltage is in excess of 2,200 volts up to 12,000 volts, it will be advisable to split up the generator into three single phase units with three containers, each containing one electrode, the three containers form again the neutral point and are metallically connected together and grounded. Owing to the comparatively high resistance of the water and the many possibilities of arranging the electrodes, it is possible to make use of comparatively high voltages such as are used in general distribution of power in industrial plants, and the use of step-down transformers, the cost of which would be greater than the cost of the steam generator itself is obviated. In order to maintain a constant steam pressure the generation of the steam has to follow closely the demand of the steam which means the electric power input has to be regulated to suit the steam demand. This is done by the variation of the electric resistance, either by changing the submersion of the electrodes, or varying the specific resistance of the water by suitably adjusting the amount of water fed to the generator and by controlling the water discharged either continuously or at certain intervals, carrying with it the accumulated impurities in the water.

The outstanding advantages of the steam generator of the water resistance type compared with other types are its simplicity in construction, compactness, easy control, and its very low cost per kilowatt capacity which is very often the determining factor, especially for temporary installations or where flat rate power is consumed to fatten the load factor of an industrial plant.

THE PORT OF GRAIN

The port of Montreal last year handled more grain than New York, Boston, Portland, Baltimore, Philadelphia, New Orleans and Galveston combined. Montreal's receipts of grain from the United States far exceeded those from Canada herself.

Such facts are interesting in connection with the proposed St. Lawrence seaway. Montreal is now at the head of deep water navigation where grain by the hundreds of millions of bushels is loaded for foreign ports. Improvement of the river channel will bring the head of deep water shipping up stream to Cleveland, Detroit and Duluth.

Montreal does not welcome the suggestion of surrendering its prestige as head of navigation and looks askance at Toronto's expensive preparations for entering into competition for foreign trade down the big river. Yet students of the project believe that Montreal has little to fear. Montreal's pre-eminence as a grain port rests as much probably on her position at what has been described as the natural center of three great transcontinental railway systems as upon her particular location on the waterway. Bringing deep draft vessels into the lakes will not disturb Montreal's favorable rail position.

American opponents of the St. Lawrence project who object to spending American money is to help develop a waterway through foreign territory should have their attention called to the fact that more than half Montreal's present grain receipts are from the United States. Trade goes by the best route and pays little attention to artificial boundaries. If grain can be loaded for Liverpool at Duluth instead of at Montreal, so much the better for Duluth, for the United States and for the growers of the grain. It matters not in the slightest that the best water route to the sea happens to lie across a corner of Canada.—"Cleveland Plain Dealer."

Off shore shipments of lumber during the year 1921 from the mainland of British Columbia amounted to 164,000,000 feet. Shipments to China and Japan accounted for 93,000,000 feet; Australia and New Zealand, 27,000,000; United States, 13,500,000; United Kingdom, 9,000,000; other places 21,500,000. In addition 700,000 bundles of shingles were shipped to the United States Atlantic ports, while 24,600 tons of box shooks went to Australia and Singapore.

The Collingwood Shipbuilding Co. are operating at present with a force of 300 men, which will shortly be increased to 500. In addition to the construction of a sand-sucker, described elsewhere, repairs are being made on the Matthews freighters, Glencadam, and the Easton. The Str. Winona of the Canada Steamships Line is also being repaired and the lighthouse and buoy ship, Grenville, Department of Marine and Fisheries, is being overhauled. In the Kingston yards the Str. Keyball is having her bottom repaired. Several other ships are to be docked as soon as navigation opens for slight repairs.

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DEPARTMENT OF THE NAVAL SERVICE

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G. J. DESBARATS,
Deputy Minister of the Naval Service.

Ottawa, Ont., 6th March, 1922.

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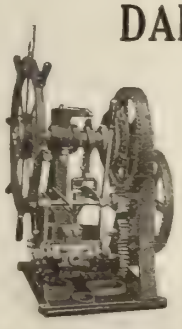

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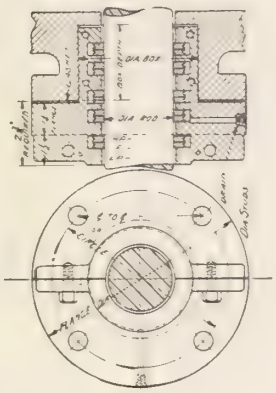

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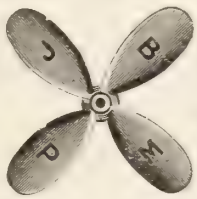

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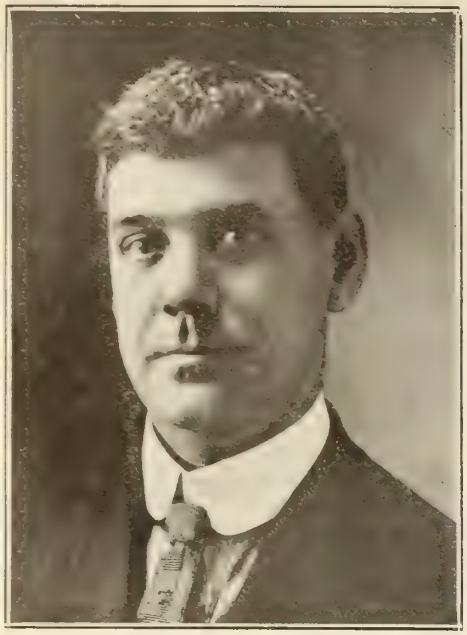

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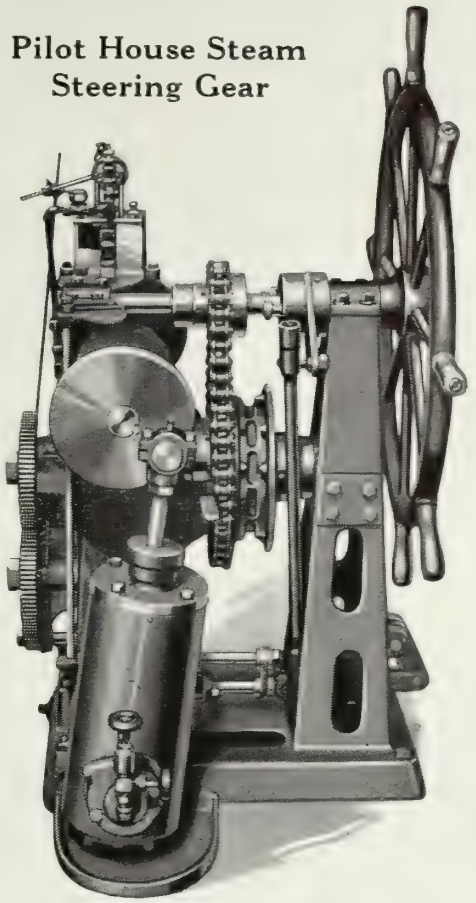

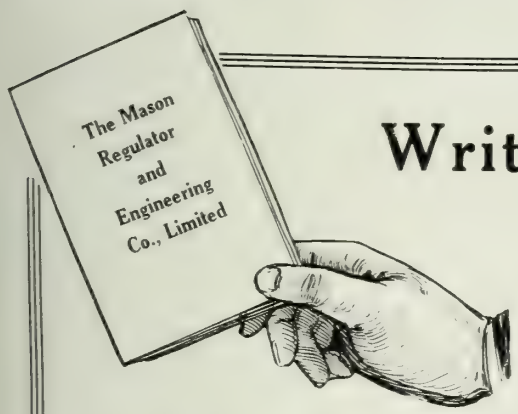

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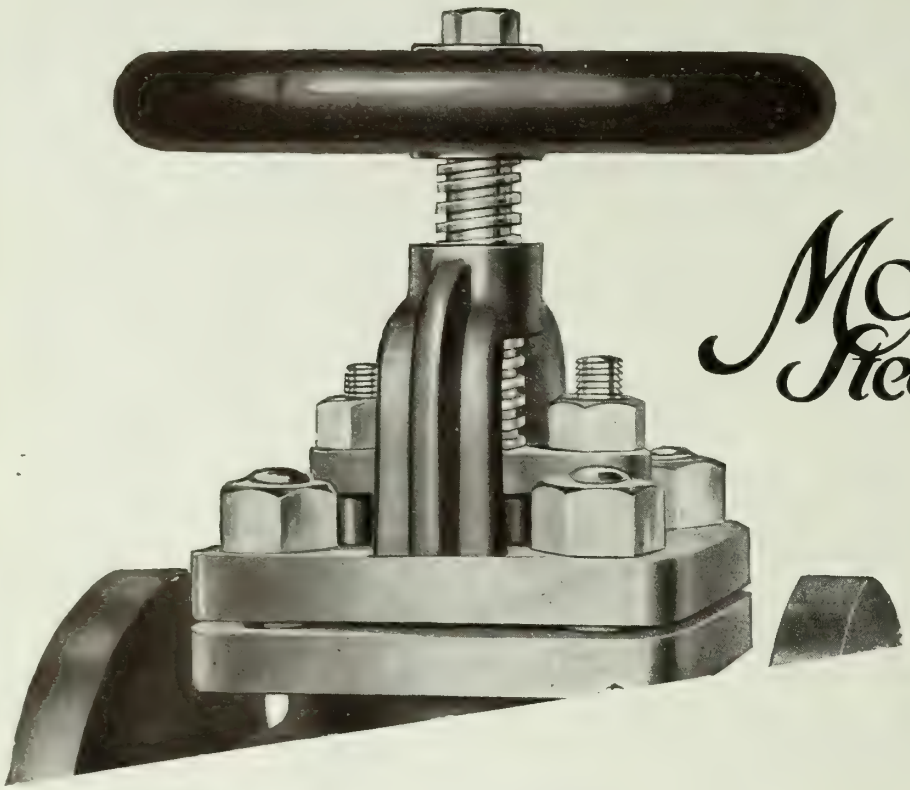

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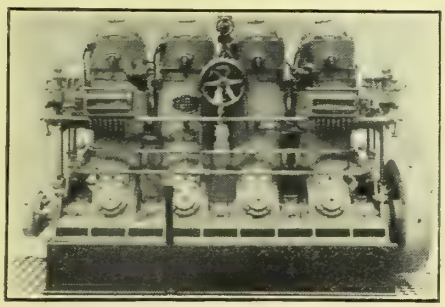

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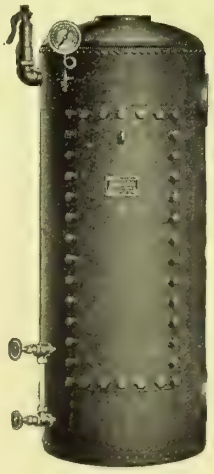

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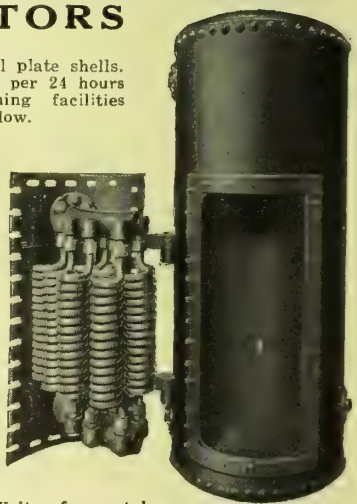

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News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

THE QUEBEC Harbor Commissioners presided over by Mr. Gerard Power, have inherited from their predecessors a heavy responsibility in regard to re-equipment and repair work in the splendid St. Louise Docks, which have been somewhat neglected since the resignation in 1916 of the then chairman Sir William Price. This gentleman, during the short term of his service as chairman of the Harbor Commission, extending over two years, proved himself by the work of improvement in the docks, to be the most active and up-to-date chairman of the board to have held office up to that time.

Sir William was succeeded as chairman by Senator D. D. L'Esperance, who continued in office until the spring of 1920, when the late Sir David Watson was appointed by the government. During the time of Senator L'Esperance's activities, which included the last three years of the war, he disposed of the splendid tug and fire boat belonging to the commission, which Sir William had specially built in Scotland. A two million bushel capacity grain barge was also disposed of, which cut into the dock equipment. The result was when the late Major General Sir David Watson took office, he not only found these valuable properties disposed of, but also that the commission was saddled with a debt or rather a deficit, approximating $50,000. Sir David who was a man of efficiency and extraordinary executive ability, immediately went to work to clear off the deficit, which he accomplished during the one year and some months he held office and not only did this, but at the end of his term of office turned over to his successor a surplus of over $50,000. Accomplishing this laudable work, he had not been able to contribute to the equipment of the Louise Docks.

The writer gives the above facts, with the view of showing that the work left to be carried out by the present board, is repair work and re-equipment of the docks, which has called for a grant of $1,500,000 from the Federal Government, and which amount is but half sufficient to meet the needs, and demands being made by the steamship companies.

Although capable of further development the present efficiency of the Louise Docks is such that it is entitled by right as the largest deep water inland port on the continent of America, and as a Canadian port, to handle a large proportion of the Canadian borne trade, more especially of that which is being devoted to United States seaports. In so far as the latter trade is concerned, the Quebec Harbor Commission may claim to be put in a position to handle such proportion of the shipping trade as is necessary to keep this port working to full capacity during the navigation season, of nine months of the year.

Quebec Harbor Facilities

The facilities now available in connection with the Louise Docks at Quebec may be summarized as follows:—there are six steamship berths in wet dock from 400 to 500 feet in length. A tidal harbor, with four berths from 400 to 500 feet in length each. Breakwater four berths 500 feet in length or three berths of 700 feet each in length. Point a Pery wharf five berths, River St. Charles or north side frontage of the dock, seven berths of from 500 to 600 feet in length, in close connection with the 2,000,000 bushel capacity grain elevator. The depth of water at low tide in the St. Charles basin is 35 feet, and at the breakwater when the ocean passenger liners dock, 40 feet. The grain elevator is a fireproof concrete building with a capacity of 2,000,000 bushels, with marine tower conveyors, and grain galleries. Loading capacity 60,000 bushels per hour. It is equipped with a grain dryer, a Richardson separator and bagging shed. The facilities and equipment for handling cargoes, etc., comprise four locomotives for switching cars, railway tracks to all berths and sheds, one fifty-ton floating crane, cars and scows for removing ships ballast. Five locomotive cranes with a lifting capacity of 38 tons each. City water supply, with hydrants to furnish shipping and in case of fire, up-to-date electric lighting and power installation.

There are in the docks convenient to ships berths twelve loading sheds, with a combined floor space of 536,356 square feet, equipped with every accomodation. The coal capacity of the docks for bituminous and anthracite coal are as follows:—coal companies have five towers for discharging and loading coal, and beside this bunkering is done from barges and from cars brought alongside the vessel. A new bunkering tip is now in course of construction along the bulkhead quay fronting on the St. Charles River, where there is a depth of water of 35 feet at low water. The Quebec Harbor Commission has sixteen miles of tracks on the Louise Docks for handling the freight and shunting is done on the docks by the commission. With the Quebec Bridge the docks are accessible to all railways including the Canadian Pacific and Canadian National Railways.

The Dry Docks

The harbor of Quebec is equipped with two graving docks, one 600 feet long by 60 feet wide at the entrance, and one new dock 1,150 feet in length by 120 feet wide in the entrance, capable of taking in the largest vessels afloat. With up-to-date engineering shops in connection capable of shipbuilding in the largest sizes, and the execution of repairs under the direction of the Davie Shipbuilding Co., and approved by the Federal Government and Lloyd's.

While the Louise Docks are being specially referred to, it must not be taken that they alone comprise the dockage for shipping in the port of Quebec. The deep water harbor is fifteen miles in length from Indian Cove at the point opposite the Island of Orleans to the Quebec bridge, with ship docks at either side of the St. Lawrence river. The harbor by its extent is capable of anchoring the whole British fleet and there is sufficient room at either side of the river to build dockage for the accomodation of 2,000 ships.

The Louise Docks though of large dimensions and capable of accommodating twenty-five large ocean liners, were built at a cost of approximately $21,000,000 and commenced in 1875. They take up but a small corner of the port at the mouth of the St. Charles River with a frontage of 2,500 feet in line with the river St. Lawrence, and if one half the money expended on this mammoth construction had been expended for the building of docks and railway freight terminals along the River St. Lawrence frontage, in line with Dalhousie and Champlain Street, from Pont a Carey wharves to the west end of Sillery Cove, Quebec to-day would be in a position to boast of being one of the largest and finest inland ocean ports in the world, with accommodation for hundreds of large ocean liners. The minimum amount of construction would have been required, as Nature has provided for the building of miles of docks and extension piers, and a depth of water of 40 feet at low tide that would have avoided any dredging.

Sir Wilfred's Plans

The plans made during the regime of Sir Wilfred Laurier, in connection with the building of the Transcontinental Railway, and the shipment of grain from the western prairie provinces provided for the building of a Union passenger railway station on the site of the Champlain Market square overlooked by the Dufferin Terrace, and the construction of ocean steamer piers west of this location along the river frontage in the direction of the Quebec bridge, together with a chain of 5,000 capacity elevators running parallel with the river, docks and piers at an estimated cost of $8,000,000. The contract had been awarded by Sir Wilfred Laurier's advisers to the well-known Canadian contractor, M. P. Davis of Ottawa, who had gathered a large amount of material on the ground including several cargoes of Southern pine, when the general election of 1911 was sprung upon the Canadian public, with the result that the Sir Wilfred Laurier Government suffered defeat. With the organization of the Borden Government, this great work for the development of the port of Quebec and the gigantic facilities for the shipping of Canadian grain from the western prairies collapsed, and never since has received the least consideration.

The Laurier Government had purchased all the sites along the waterfront, and had constructed a railway freight terminal and switching yard at Cap Rouge in the vicinity of the Quebec Bridge, with a capacity for packing 10,000 freight cars, a magnificent railway house with machine shop attached, and a passenger station. This freight yard constructed at a cost of $1,000,000 was discarded by the Canadian National Railways executive, and the grass is now growing on the waste land and the round house and machine shop which cost around $200,000 is levelled to the ground, and the Transcontinental Railway, one of the finest built in America, neglected instead of being used for the purpose for which it was built.

This is a state of affairs that if understood by the Canadian public would create a feeling of righteous indignation throughout the entire country from the Atlantic to the Pacific.

The important question being discussed these days in and out of Parliament is the movement of the Canadian grain trade from western prairies for export, and the high cost of transportation so vital to the grain growers. The most lamentable circumstance in connection with the transportation of Canada grain is the routing of the cereals over United States railways to United States seaports for shipment, instead of over Canadian roads and to Canadian ports.

The importance of this subject can be properly gauged, when it is considered that during the past ten years, approximately one billion bushels of Canadian grain have been transported over U. S. railways, and shipped abroad through U. S. ports, which means that approximately $150,000,000 of the Canadian farmers' money, has been handed over to the U. S. railway and shipping interests. This money should have been circulated in Canada for the benefit of Canada. If the Grand Trunk Pacific and its connecting link, the Transcontinental had been operated for the purpose for which they were built, this serious state of affairs would have been obviated.

Instead of moving the grain to Montreal and Quebec in the summer season, and to Halifax and St. John in the winter, which would save 12 cents a bushel, the grain is shipped via Buffalo and other lake ports, or by the G. T. R. to Portland for export.

It was for the purpose of putting a stop to this condition that the Transcontinental was built. When it was finished in 1916 and taken over by the government, the government traffic manager. Mr. C. A. Hayes, made a freight rate of six cents per bushel from Armstrong to Quebec, for export wheat. Armstrong is a station on the main line of the Transcontinental, the same distance from Winnipeg as Fort William is, and it was selected for that reason. The immediate effect of the rate was that six large steamships loaded at Quebec, and the Minister of Railways stated in the House that the rate was a profitable one for the railway. Very shortly afterwards this special rate was cancelled and no more grain was carried over the Transcontinental. The Minister of Railways stated in 1920 that he was mistaken in stating in 1916 that the six cent rate was a profitable one, and that it was impossible for railways to compete with water transportation. The rate for wheat from Armstrong to Quebec was raised to 25 cents or four times the 1916 rate. The new rate was prohibitive and had the effect of driving the trade to Buffalo and New York, at the expense of the grain growers. Of course the cost of operating railroads has increased to the extent of 57 per cent. since 1916. but even if the additional cost is considered, and 100 per cent. is added to the six cent rate from Armstrong to Quebec, making it twelve cents, and a proportion rate for the 390 miles from Armstrong to Winnipeg, the through rate for the whole distance of 1,350 miles would only be 17 cents.

The charge of 36 cents calls for some explanation from the government, causing as it does the diversion of the grain carrying trade from Canada to the U. S.

The question is, why should the government be bound by custom and the wishes of the railways? It suits the C. P. R. and the G. T. R. to let this traffic go by water to the elevators at Port McNicoll or Midland, where it is in a convenient position to be re-shipped to New York, Boston, or Portland on their own and affiliated lines. The government is not in the same position. Their duty is to favor the Western farmer and the Canadian seaport, and the remedy is to operate the Transcontinental, with the Canadian Government Merchant Marine in addition. This would save shippers the extra charge of handling, and grain losses at the Lake ports, and also the extra for the rail haul from Winnipeg to Fort William.

The Transcontinental would thus become the saviour of the country instead of being a burden to it, the St. Lawrence route would be greatly strengthened and the Port of Quebec given a square deal.

PORT OF ST. JOHN

THE month of April will bring the Winter Port season at St. John to a close. The Empress of Britain for Liverpool and the Sicilian for Cuba and Jamaica via will complete the Canadian Pacific passenger sailings.

Compared with other years the immigration through the port has been lighter, due probably to the money entrance requirements. Outward passenger traffic has been heavier. The passenger arrivals through the port this winter up to April reached a total of 9,400, of which 6,000 were steerage and 3,400 cabin. The number of passengers outward were 2,700 cabin and 4,200 steerage.

The first quarter of 1922 shows a marked increase over last year's period in the number of ships entering the port, in the revenue that the city has derived from them, in the quantity of grain shipments forwarded by the two company's elevators, and in the export of sugar, flour and cattle. General cargo shipments have shown an increase during the month of March.

Grain shipments through the C. P. R. elevators this year reached a total of 8,086,545 bushels compared with 6,281,521 bushels for the first quarter of 1921. This makes a total for the present winter season of 10,579,744 bushels. Through the C. N. R. elevators 2,532,572 bushels of grain have been exported this year as against 1,281,843 bushels for last year.

Number of ships entering the harbor during the first three months of 1922 totaled 149 steamers, these figures compared with last years 124 steamers for the same period show a definite increase.

The revenue ($31,231.06) derived, top wharfage, etc., from wharves owned by the city established a record during the month of March, being about $1,200 higher than any single month in the history of the port.

Customs receipts from all sources for the month of March 1922, reached a total of $743,252.32 as against $369,115.76 for March 1921.

With increased facilities for handling of cattle provided last fall by the Dominion Government the cattle shipments this year have shown a big increase, between 2,500 and 3,000 head of cattle being shipped so far. The Manchester Corporation will take a record shipment of cattle the latter part of April. It is expected that she will carry in the vicinity of 712 head.

Potato shipments from this port have been heavy, running as high as two boats a week at times. In reference to these shipments, the assurance given Maritime members in the House of Commons by officials of the Department of Public Works that enquiries were being made looking toward the establishing of facilities in St. John for all year round potato shipments is of interest here.

The schooner traffic has picked up this season as many as 14 being recorded at city wharves for the period of Jan. 1—April 15. Brightening of lumber trade to the States together with salt and fertilizer inward shipments is held responsible for the improvement.

Reports of lumber and lumber products to the United States show an improvement, but they have not yet reached last year's quota. The export values for 1922 were 582,220.10, values for same period last year being 616,966.11.

With a view to fostering still further Maritime trade with the West Indies the New Brunswick legislature while in session on April 12 unanimously passed a resolution covering the appointment of one or more trade agents under the dept. of agriculture to represent New Brunswick in the above territories. There are two lines of steamers already being operated from Maritime Ports to these islands.

On the 1st of April the C. P. R. Bay of Fundy Service was transferred from the Steamships Dept. of which the late Capt. Hawker was local Supt. to the operating department New Brunswick District. J. M. Woodman is Gen. Superintendant of this department. The Bay of Fundy steamer "Empress" is at present being fitted out with oil-burning engines.

HALIFAX AND N. S.

THE ANNAPOLIS Valley, famed for its apples, yielded a record crop last summer when over two million barrels were gathered in and of this total a million and a quarter barrels were exported to foreign markets. Ninety per cent. of the apples exported were shipped through the port of Halifax and the 1921-22 season was the second largest on record. Approximately 1,135,000 barrels passed through Halifax and of this total 1,116,583 barrels were to the markets of the United Kingdom. The export from the valley last season, including shipments to all points, was 1,577,604 barrels.

During the past fourteen years 8,207,096 barrels of apples have been exported from the Annapolis Valley to foreign markets via the port of Halifax. The record season was that of 1911-12, when 1,260,882 barrels were shipped from this port.

The record for the fourteen years period is as follows:

1908 09	515,049
1909-10	705,512
1910-11	243,352
1911-12	1,260,882
1912-13	881,776
1913-14	522,655
1914 15	707,082
1915-16	376,826
1916-17	366,804
1917-18	No shipments owing to embargo.
1918-19	129,916
1919 20	480,396
1920 21	888,713
1921-22	1,128,160
Total	8,207,096

The above figures show that apples are one of the chief exports of the Port of Halifax. During the season just closed there were 111 apple sailings from Halifax to the ports of the United Kingdom, in addition to sailings to other markets, including Newfoundland and the United States. This season there were 78 sailings.

A most successful test of the facilities available at the outports along the Nova Scotian coast was made recently when several part cargoes of pulp, each in the vicinity of 2,500 tons, were shipped from Digby. It was found that cargoes of this kind could be adequately handled at Digby and in future all pulp from the Sissiboo mills at Weymouth will be shipped from Digby.

Urged on by the success attended at Digby another experiment is being made the end of April at Shelburne, when the steamer Gyp arrives there to load about 2,800 tons of pulp from the Clyde River mills. If it proves a success, Shelburne will be the port of export of the pulp from these mills.

In the case of both Digby and Shelburne it was the first tests that were made to test whether the cargoes could be loaded at these outports. Formerly the pulp was brought by rail to Halifax, but with the developments of the facilities at Digby and Shelburne, Halifax is the loser. However, some pulp is to be shipped from that port and up to the present steamers have only loaded part cargoes of pulp at the ports mentioned and come to Halifax to complete their cargoes.

The two-masted schooner, Eva June, which left Halifax on August 31 last, on an expedition to the South Atlantic Seal Fisheries, returned on April 13. The trip was a success, the vessel securing 2,240 skins, whereas on her trip the previous season she hailed for only 1,510. Throughout the eight-month trip the vessel had fairly good weather but had some difficulty in crossing the Gulf Stream on her trip north. After spending three months on the sealing grounds she put into Montevideo, where the skins were landed and shipped to England. She left Montevideo on February 14 and was forty-eight days making the run to Halifax. The vessel was in command of Captain Matthew Ryan, of North Sydney, C. B., a veteran of the seal fisheries, and her crew comprised men who have had much experience in hunting seals.

A delegation of the Nova Scotian members of parliament together with C. W. Anderson, M. P. P., for Guysboro County, waited on the Federal Government in Ottawa this month and urged that one of the Canadian Government Merchant Marine ships at present laid up at this port be utilized in an effort to provide better steamship accommodation for the ports along the eastern shore of Nova Scotia. The shipment of live lobsters from these ports to Boston was one of the reasons for the request for better steamship service. It was pointed out that the cost of sending lobsters by way of Yarmouth was most expensive and much money was paid out in freight rates. They urged that one of the ships lying idle in Halifax be used to collect these lobsters and proceed direct to Boston with them. While adequate facilities for transportation were available, there used to be about one thousand crates a week shipped and if the facilities were improved there would no doubt be an increase in the export. Up to the middle of April nothing had been done by the government.

According to activities at Parrsboro, there seems to be a revival of the lumber trade approaching. Several million feet of lumber is being gathered in that vicinity for shipment to British ports.

Conditions in the marine engineering trades have shown some improvement recently. The plant of Thompson Bros., Machinery Co., Ltd., at Liverpool, Queens County, is working full time, while the plant of the Robb Engineering Company at Amherst, closed for some time, has started up, orders for two big boilers having been received.

During the past month the French Cable ship, Edouard Jeramec, which has its headquarters at Halifax, has been laid up having new furnaces installed. T. Hogan and Company had the contract. The launching took place at Lunenburg on March 28 of the new fishing schooner Mahaska, which is to be entered in the

elimination series the coming fall and will be a contender with the Bluenose for the honor of representing Canada in the International Ocean Schooner Race Series. The Mahaska is a little smaller than the Bluenose. She has the Bluenose bow, while her stern is "the happy medium" between that of the Bluenose and the Mayflower. The new vessel's underbody is more concaved than that of the Bluenose and therefore she is along finer lines. Designed by G. A. Rhuland, also builder of the Bluenose, she was built in his own yards and many predict that she will show the Champion Fisherman a clear pair of heels. For comparison the following are the dimensions and spar measurements of the Bluenose and the new craft:

	Mahaska	Bluenose
Length over all ..	131 feet	142 feet
Length waterline .	108 feet	110 feet
Beam	25.8 feet	27 feet
Depth of hold	11.6 feet	13 feet
Mainmast	90 feet	96 feet
Foremast	78 feet	73 feet
Maintopmast	40 feet	51 feet
Foretopmast	40 feet	46 feet
Main boom	72 feet	81 feet
Maingaff	45 feet	46 feet
Foreboom and Fore gaff	30 feet	33.6 feet

The chief differences between the Bluenose and the Mahaska are that the latter has a sharper bow, wider stern, her underbody concaves fore inwardly down to her keel and she is a smaller craft and consequently carries less canvas.

Another new vessel, which is expected to be entered in the Nova Scotia Fishermen series, is the Patara, built at Mahone Bay, by the Ernst Shipbuilding Co., and completed during the winter. She measures 145 feet overall, 27.3 feet beam, and 11 feet depth of hold. Like the Mahaska she is now on the fishing grounds.

Smith and Rhuland, builders of the Bluenose and the Mahaska, have contracts for the construction of five fishing vessels. One of these will be from the same plans as the Mahaska while the other four will be from the plans of the schooner Uda R. Corkum, a type which has proved most serviceable.

Two other new schooners have been launched this month from Nova Scotia yards. Early in the month a knockabout fisherman was launched at Belleveau's Cove, having been built by A. J. Theriault for Captain Arthur Creaser, of LaHave. She is named the Hamona and was designed by McManus, the well-known Boston designer. She measures 130. over all, 26.6 beam and 11 feet depth.

The other vessel launched was the Dorothy O from the yards of the Shelburne Shipbuilders at Shelburne. She was built for Harvey and Co., Ltd., of St. John's, Nfld., for bank fishing out of Belleoram. Her dimensions are, length over all, 110 feet; beam, 24.6 feet; depth 10 feet.

The steamer, E. M. Boutilier, built at Digby in 1919 has been sold to H. Guy Smith, of Port Hood Island, and R. E. Jameison, Hawkesbury, who propose engaging her in the coastwise trade between Nova Scotia, P. E. Island, the Magdalen Island and Newfoundland.

The small boats along the shore Nova Scotia engaged in fresh fishing have been doing very well since the spring season started. The same is true of the larger vessels engaged in fresh halibuting on the banks and also to the work of the steam trawlers.

Recent schooner sales include the following Nova Scotian craft purchased by foreign interests; the R. L. Borden, bought by Newfoundland parties; the Kakuskak, sold to Barbados parties, and M. M. Gardiner to Nassau; and the Phyliss L. Westhaver to parties in Newfoundland.

Montreal Notes

THE MONTREAL Harbor Commissioners paid a visit to the Port of New York the latter part of March and they stated on their return that they believe that Montreal will be able to hold its own and more with any competing port. Although most of the time they were away was spent at New York, they also made brief inspections of Boston and Portland. In New York the Commissioners were impressed by the enormous difficulties that have to be surmounted to bring that port up to anything like efficiency. The New York commissioners all expressed the opinion, that even with improved facilities, it would not be possible to reduce the cost of handling cargo and goods in that port, and unless an increase took effect in the Montreal rates, New York could not compete with the latter port. They were informed that Montreal expected to reduce its charges some 15 per cent. for the 1922 season. Apparently there were two cardinal impressions left with the Montreal commissioners as a result of their trip of inspection. First was that the new cold storage plant in Montreal is of a high standard compared with other installations, and, conditions in the port of New York are so congested, that traffic is being driven away.

In Boston the commissioners found very good facilities for handling freight and traffic but there was very little business offering and for that reason the State had abandoned its project for erecting a new grain elevator in South Boston. Conditions in Portland Me., were much the same as in Boston. The opinion of the Montreal Commissioners is that Montreal has got at least equal facilities on a smaller capital expenditure as compared to the U. S. Atalantic ports, and can offer them a real competition.

On Monday, March 27, work was begun on the extension to the jetty in front of elevator No. 2. This, when completed, will provide two additional berths 500 feet long for the accommodation of tramp steamers, or full grain cargo vessels. This new jetty will be provided with four belts, two to be used on each vessel, and grain will be delivered at a much more rapid rate than has yet been possible, on account of the direct shipping to the vessels. In addition, the system is being remodeled so that vessels can load from either Elevator No. 2 or No. 1, direct, eliminating the former necessity of re-weighing, as in former years when grain from No. 1 was transferred to the vicinity of No. 2. As most of the tramp vessels take less than 300,000 bushels, it was stated by Mr. Fennell, general manager of the Harbor, that the new facilities would make it possible to load four tramp steamers every 24 hours. Last season a great complaint was that the tramps had no regular berth in the port, and had to be shifted around at considerable tug expense to get their cargoes. Mr. Fennell said the new Harbor Commissioner had spent the past two months studying this matter, and had decided that the tramp vessels should be given facilities for themselves. Hence the present arrangements, which would facilitate loading, and remove the fear of high towage bills, which were so much complained of during the period of congestion last year. These facilities will be ready for operation by the opening of navigation, and will encourage the visits of tramp seamers to Montreal for grain cargoes.

The summer sailing schedule of the Canadian Government Merchant Marine, Limited, recently issued, shows that the company will maintain eight distinct services from Montreal during the coming season, employing thereon some thirty steamers. There will be sailings every two weeks to Liverpool, to London, to Glasgow, and to Barbados, Trinidad and Demerara; every three weeks to Cardiff and Swansea, to Charlottetown and St. Johns, Nfld., and to Nassau, Kingston and Belize; and every four weeks to New Zealand and Australia. The C. G. M. M.'s Montreal season will be opened according to the new schedule by the departure of the steamer Canadian Volunteer for London on May 4. She will be followed on May 5 by the sailing of the Canadian Conqueror for Liverpool, which service will be maintained by steamers equipped with refrigerator accommodation. On May 6 the Canadian Navigator will sail for Glasgow and the Canadian Sapper will inaugurate the Charlottetown and Newfoundland service. Services to both western and eastern groups of the West Indies islands, which were first established from Montreal by the Canadian Government Merchant Marine, will commence on May 10th on which date the Canadian Beaver will sail for Barbados, Trinidad and Demerara and the Canadian Fisher will commence the com-

pany's combined passenger and freight service to Nassau, Kingston and Belize. The remaining two services will be commenced from this port on May 23, the Canadian Planter sailing on that date for New Zealand and Australia, and the Canadian Squatter for Cardiff and Swansea. The Canadian Government Merchant Marine will also operate twelve steamers to Vancouver during the coming season.

The need of increased fire protection in the Harbor of Montreal was placed before the Council of the Board of Trade on March 30 last. The council referred the matter to its Harbor and Navigation Committee. It was pointed out that while the harbor wharves and ships are modern and practically fire proof, the sheds have always in them a proportion of highly inflammable goods, and the most of the material stored in them would burn freely if ignited. It was pointed out further that the properties on the Lachine Canal are not so modern and fireproof, so that both with new and old properties the question of fire protection is a serious one. During the coming season of navigation the port of Montreal will be used by an increased number of fuel oil burners, and as such vessels will clean out their bunkers and be bunkered while lying at the wharves, they will involve a considerable increase in the fire hazard.

The Montreal Quebec passenger service of the Canada Steamship Lines will recommence on April 24th with the departure of the Steamer "Cape Diamond" from Montreal. The Cape Diamond will be followed by the Steamer "Saguenay" on April 25th which steamer will call at Sorel and Three Rivers en route to pick up freight. During the past winter both these steamers have been thoroughly re conditioned in preparation for the coming season. The Canada Steamship Lines freighter "Edmonton," which spent the winter at Kingston, Ontario, expects to bring down a cargo of grain from Port Colborne to Montreal before leaving for the western lake ports. She is expected to be the first vessel down through the Lachine Canal. The Toronto-Hamilton-Montreal service maintained by the steamers City of Ottawa, City of Hamilton, was opened on April 20th. The Canada Steamship Lines expect to inaugurate a package freight line between Montreal and Detroit with calls at Toronto, Hamilton, Cleveland and other points en route. This is really the resumption of a service that operated up to 1914 which was known as the Montreal-Lake Erie Line. The service is to be started as soon as navigation opens and to begin with, there will be two boats operating. By this service the Canada Steamship Lines expect to be able to carry freight into the middle west on United States territory on differential basis below freight rates affecting transit through the ports of Boston, New York and Philadelphia and then by rail, as the St. Lawrence route carries freight so much farther inland by water. This new route, it is asserted, will therefore provide importers and exporters with all water rates considerably lower than rail on business between Detroit and Canadian points as well as through rates in connection with ocean lines operating between points in Great Britain and the European countries and Montreal. The terminal facilities of the Canada Steamship Lines at Montreal are so located as to ensure prompt movement and satisfactory handling of import and export business. The fact that in the coming navigation season there will be a greatly increased ocean tonnage visiting Montreal, as all the leading steamship companies are putting on new liners which will be a great factor in contributing to the maintenance of this new inland service. It is claimed that there is every prospect of a large share of the automobile trade of Detroit passing down this way instead of through American ports.

News came on March 28th from North Sydney, N. S., of the first disaster of the 1922 sealing season. The steamer Diana, which for two weeks was penned in among the ice fields with her tailshaft broken and unable to free herself, was crushed by the ice and her crew were forced to abandon her. The steamer was an ex-whaler and after being badly pinched she commenced to leak so badly that her commander, John Parsons, thought that it would be dangerout to continue on board any longer, and signalled for one of the fleet to come to the rescue and take the men off. The Sagona, the only craft which was sent out by the Reid-Newfoundland Company his year, at once responded and came as near as possible to the sinking steamer. The work of transferring the crew was accomplished without accident. Before finally leaving the steamer, Capt. Parsons set here on fire. The Diana was built in England for the whaling and sealing industry, and came to this country under the name of The Hector. Later she was purchased by James Baird, Ltd. of St. John's, N. B., to participate in the sealing industry and during her campaign on the grounds has been fairly successful.

It was formerly announced on April 19th that the government had purchased the ice-breaker, J. D. Hazen, which was built at Canadian Vickers, Limited, Montreal, in 1914 and subsequently sold to the Russian government. The boat is now named Mikula and is lying in Cherbourg Harbor, France. It is stated that the cost of the boat to the Canadian government was $400,000. Assistant Deputy Minister Hawken is at present in France and has been looking after the deal.

On March 28th an important meeting was called by the Minister of Marine at Ottawa and to which representatives of the Railways and shipping interests, both ocean and lake, the grain elevator interests and the Montreal Harbor Commissioners were asked to attend. The meeting was convened to discuss with the Minister the movement of grain through Canadian channels to the port of Montreal for export during the coming season. A round table conference was held and the whole question was gone over and it is believed that such plans were made that will enable Canadian rail and water routes to retain the supremacy of the grain trade that they won last year.

Capt. J. F. Lindsay, who was recently appointed Deputy Port Warden for t Port of Montreal arrived in the city about three weeks ago from Halifax and assumed his new duties. Upon arrival here the Port Warden, Capt. R. E. Brown, was confined to his bed with pneumonia and Capt. Lindsay started in his duties under the title of Acting Port Warden.

On March 28th, The Canadian Pacific S. S. Empress of Canada was returned to the builders for alterations after her trial trip. According to a statement made at that time by Mr. G. M. Bosworth, chairman of the C. P. R. steamships, the Canadian Pacific liner would be in commission early in May. It is further stated that she was able to attain the speed which was guaranteed. The defect which made itself apparent was in one of the double reduction gears but in all other ways the vessel is a credit to the builders, The Fairfield Company.

The Lachine Canal was officially opened for the 1922 season on Wednesday, April 19, when the Canadian government steamer Lady Grey passed up the canal en route to the foot of the Soulanges Canal where the channel was still blocked by ice. Several new gates an bridges have been placed over the Lachine Canal during the winter by the Dominion Bridge Company. These were only recently completed and first opened for the passing of the Lady Grey. They are steel and cement and replace the old wooden gates and bridges.

Late in March, fish from the Pacific coast of the United States appeared in New England fish markets in active competition with Atlantic products. These fish were brought to the east by refrigera or steamers via the Panama canal, and this is an entirely new departure. As the Pacific season for mackeral is at least six or eight weeks ahead of the Atlantic season the fish met with ready sale.

There is every indication that passenger traffic from Montreal this year will reach record proportion. All traces of war-time restrictions and curtailment have been obliterated and everything is now back in its pre-war state. One company which is greatly increasing its activities in many directions is the White Star and associated lines. This company is placing on its various services a number of new ships aggregating more than 150,000 tons.

At Lunenburg, N. S., on March 28th, the schooner Mahaska, a prospective contender for the fishermen races next Autumn, was launched from the yards of Smith & Rhuland.

Current News of The Ancient Colony

Special To "Canadian Shipping"

Marine conditions on the whole are not much different in Newfoundland than they are in any other British possession, whose authorities are more or less subject to Imperial Board of Trade regulations, or at least if not entirely governed by them, take them as a basis for the formulation of rules for the guidance of their Mercantile Marine. This, in the "Ancient Colony" applies to all classes of foreign going and coastwise shipping, no matter their tonnage or capacity. To Newfoundland mariners, perhaps, more than to those of other Overseas Dominions, the Imperial Board of Trade is the incarnation of all the high gods that preside over the destinies of seafaring men, be they of the deck or engine room staffs. It is the fetich of all who hold certificates of qualification earned by competency, and woe betide the wight who dares to think otherwise. He is made to feel the enormity of his offence against the traditions, and should he persist in promptly sent to Coventry.

Sealing Masters Different

But there is one class of ship and skipper both of whom are not at all willing to—nor do they—recognize or obey Board of Trade commands. These are the Ships comprising the Sealing Fleet and the men who command them. This fleet is practically confined to Newfoundland, and local Acts of Parliament are annually passed for its guidance in the prosecution of the Seal Fishery, which begins early in March of each year. Agreements are made between Owners, Masters and Men, based on custom, and probably from the time when the first sealing crews signed articles for the voyage, there has been but very little change in either the verbiage or the principle. Though somewhat similar to regular articles, the difference in the main, is the extension of the duties to be performed and the rate of wages to be paid, the latter being a share of the catch, the division of which is calculated in three parts, viz: one for the ship, one for the outfitting and other expenses of the voyage, and one to be equally divided amongst the crew. The voyage is more or less of a gamble, for the actual conditions are, so far as the crew is concerned, and this includes Masters and Officers as well, no seal, no wages.

Engineers on Another Footing

The engine room staff did not formerly sign sealing articles under these terms, being on a somewhat different footing from the navigating and ice officers. In the early days of the steam fleet their pay was at a full monthly rate, plus one ordinary share, that is the sum earned by the ordinary deck hand or sealer; this being given by way of bonus. Of course if there was no killing made, no bonus could be paid; nevertheless the engine room squad had the advantage of never drawing blank, because they were always sure of one month's or more wages during the term of the voyage. This state or condition of agreement was in vogue up to the year 1919, when a different plan was submitted, the purpose being, to put the engineers, of whom there are not less than three to each ship, on a share basis solely. The inducement offered was a two per cent. commission on the gross proceeds of the voyage up to the value of $30,000: three per cent. if $40,000 and up to $50,000, and four per cent. of the proceeds of the ship's catch if amounting to $50,000 or over. No monthy wages however, were to be paid. The sum of such percentage was to be divided pro rata amongst the three or four engineers of each ship, according to the amount earned by the ship. This agreement was accepted by the engineers and carried out during the springs of 1919, 1920, 1921. The result was that those in the fortunate ships made fair wages, but those in the vessels which did not do well, came out at the small end of the horn, and so they decided this year that they could no longer accept the same terms as a basis of agreement for wages.

Making New Demands

Having considered through the Association of Marine Engineers that the percentage wage was no longer satisfactory, negotiations were opened by correspondence between the Association and the Sealing Ship Owners, with a view to going back to the old custom of payment during the voyage, or of adopting a new schedule altogether. It must be noted that the Engineers deferred making their demands known until but within a fortnight of the sailing of the fleet for the Northern ice, a fact which lost them considerable popular sympathy. On 20th of February the first gun in the campaign was fired by the Secretary of the Engineers Association writing Messrs. Bowring Brothers, Ltd., owners of four ships, the managing director of this firm being Chairman of the Sealing Steamer Owners Committee. In this letter it was pointed out that the Engineers had decided at a meeting, that they could not promise to engage in the seal fishery unless they received port wages from the first of March until the termination of the voyage, plus the percentage allowance as noted above. This demand was replied to briefly by the Sealing Owners, merely regretting the decision of the Engineers. A meeting of principals was next arranged, which did not simplify matters, and subsequently the Marine Engineers issued practically an ultimatum, declaring that if their proposition was not accepted no engineer of the Association would sail on any ship prosecuting the seal fishery. This decision was made in the communication "absolutely final," though the secretary regretted the disruption of the previous good relations existing between owners and engineers. The final letter was written by the Owners Committee on February 28th, again regretting the decision of the Engineers. In the meantime as a solution of the difficulty an option was suggested by the engineers themselves. It was that Owners agree to accept an alternative. The engineers asked for wages and the regular percentage, as per the original demand, but were agreeable to accept wages plus an ordinary share, provided that when the voyage ended the amount of such realization would not be less than wages plus percentage. If the sum was less then they would ask to be paid off at the higher rate, whether that rate was wages plus commission, or wages plus share. It will be at once determined from this that the artificers were looking out for the best bargain they could make, and no person disagrees with them for that, though it was really a case of "heads I win. tails you lose" in favor of the engineers.

The Fleet Sails

Eventually a sort of compromise was effected, four of the ship owners agreeing to the option, and five ships sailed having Association staffs. The firm owning four ships would not agree to the demands, and sent their vessels out with engine room staffs of non-association members, the chief engineer in their commodore ship being their own superintending engineer. The other three ships were furnished with engineers of sorts, according to the Association. On eighth of March, the fleet sailed, eight going to the Northern front and one in the Gulf of St. Lawrence. The spring on the whole has not proven a good one, and the catch therefore is likely to fall considerably short of last year, which even was not an average. It is rather singular that the ships with non-associate engineers have been reported for bigger catches with but two execptions, than those having association staffs. Ere this article sees print, if ever it does, the sealing voyage of 1922 will have been concluded, and it will be interesting after the crews have been paid off to make a comparison of the wages earned by the engineers of the various ships. It might be worth noting that after the arrival and discharge of the fleet, most of the ships are laid up and do not go into commission again until the next sealing season. In such cases it was usual to place the chief engineer in charge for the ten months of laying up, at a wage rate of forty per cent. less than regular pay, his business being to keep the engines in condition, and to have everything ready for getting up steam in case of an emergency call for the assistance of the ship, which sometimes happens when vessels in distress off the Newfoundland Coast send out

The "Diana" Caught In the Ice.

The "Sagoma," Rescuing Diana's Crew.

S. O. S. signals for immediate aid.

Shipping Disasters

The months of January, February and March are usually the most disastrous to Newfoundland shipping, principally of the foreign-going class, and the record of the first quarter of the year 1922 has not diminished. Most of the losses are sustained by vessels coming on the Coast during the extremely severe weather which prevails during the winter season, yet many become casualties when going from port to port on coasting trips, or proceeding from one port in the island to another to load cargo for Europe or the West Indies. Ice on the coast too, often accounts for the ships-that-never-return. In fact several of the steamers in the Coastal Service of the Colony have had the experience of being frozen up for weeks, and it is but recently that they have managed to extricate themselves from a position that is invariably perilous.

The first shipwrecked crew to arrive in St. John's in the month of March was that of schooner "Rose M," which sailed from Fogo on December 20,1921, with a fish cargo for Malaya. A succession of gales were encountered and tremendous seas swept the vessel carrying away everything movable off deck, opening up the seams and smashing boats to fragments. Keeping before the gale captain and crew, with superman courage, managed to approach Fayall (Azores) where they beached the ship, all being eventually taken off by the hardy fishers of that island. From Fayal the ship's company went to New York, finally arriving in St. John's over two months after clearing from Fogo.

A Row of Two Hundred Miles

On the seventeenth of January last, schooner "Lowell F. Parks" left St. John's for Harbor Buffett, a port in Placentia Bay, there to complete a fish cargo for Oporto. The ship never reached her destination, a storm springing up which drove her far to the Soutward. Nothing was heard of vessel or crew until late in February, when the joyful news was flashed over the cables that the men had arrived at Barbados safely, having abandoned the schooner about two hundred miles North of Barbados, rowing the entire distance in the ship's boat, an open, undecked small craft with life tanks. A remarkable coincidence in this case was that the captain of the "Parks" met his brother at Barbados the latter having put in there in his vessel which had been practically dismantled by storms and hurricanes on a voyage from Cadiz to Marystown, also in Placentia Bay, with salt cargo.

Sealing Steamer Goes to Bottom

The only casualty among the sealing fleet so far is that of S. S. "Diana." With other ships of the squadron the "Diana" sailed for the frozen pans, and in company with her consorts struck the seals almost at once being the first ship to report for any number. Some days afterwards while butting ice, the tail shaft broke and the propellor went to bottom. Nothing could be done to repair damages, and the ship being fast in the floes, no effort could be made to work her to port. S. O. S. calls were sent out and answered by other ships, two of them Sagona and Thetis, steaming toward their disabled consort. The former ship was first on the scene and transferred the crew and as many seals as could conveniently be hauled aboard. The ship, though in the ice, was dangerous to navigation, and consequently before leaving was set on fire, taking the plunge in the sight of those who ha but so recently been full of hope ov the prospects of making a good spring's wages. "Sagona" brought the wrecked men to land at Perlican, whence they were taken by a Government boat and conveyed to their homes. Because of this act of salvage, "Sagona" was obliged to abandon the voyage, and was therefore the first ship to arrive to the delight of the lucky holders of sweepstake tickets carrying her name and the number of seals taken.

Man Swept Overboard

The second wrecked crew to reach St. John's in March was that of schooner "Asquith," which left a port in Spain on January 1st, with salt cargo for that place. When about four hundred miles off the Newfoundland coast, terrific storms were encountered, causing the straining of the vesse and the admission of water to the cargo. All hands were kept at the pumps, which ultimately became choked. During this work one of the crew was swept overboard by a huge sea, another barely escaping with his life by being luckily caught in a fold of the mainsail, lowered at the time. When hope had almost been abandoned and the crew resigned to the inevitable, a ship hove in sight, and taking the unfortunates off landed them at Gibraltar from which place they were sent to Liverpool, taking passage home by S. S. "Sachem." One other local vessel has to be added to the March list. Schooner "General Currie" crashed on the rocks at Dog Island, St. Pierre, on March 30th and became a total wreck, the crew landing safely.

ANOTHER BRITISH TRADE SHIP

Some time ago arrangements were completed for the building of a special vessel to act as a floating exhibition of British manufactures. For various reasons the voyage of this ship has been postponed for a year or two. Meanwhile a large British liner has been acquired for the purpose of being converted into a trade ship. The cabins will be used for the accommodation of the representatives, and the holds and other portions of the vessel will be adapted for exhibition purposes.

A SLIDE RULE FOR NAVIGATORS

The slide rule is one of the most familiar and at the same time one of the most useful appliances for the engineer. Special forms have been adapted for a great variety of purposes in order to save time in making numerous calculations of the same kind. The electrician, the chemist, the optician, and others have enjoyed the convenience of these special slide rules, but curiously enough the navigator (who has to perform the same sort of calculation every time he takes a sextant observation) still employs logarithmic or other tables. One reason why he has been left out in the cold is that his calculations have to be exceptionally accurate. thus necessitating a very long scale. The problem was, however, tackled very energetically by the British Air Force and the difficulty of obtaining a very long scale within a convenient compass was overcome by arranging the scale in a spiral form. The apparatus proved very successful in

Appointments To Canadian Steamships Season 1922

CANADA STEAMSHIP LINES

FREIGHT DIVISION—UPPER LAKE

Master.	Steamer.	Engineer.
C. E. Robinson	W. Grant Morden	Jas. McGregor
Peter McKay	J. H. G. Hagarty	I. J. Boynton
J. F. Davis	Westmount	J. E. Readman
D. W. Burke	Emperor	Geo. N. Smith
J. M. Hudson	E. B. Osler	R. R. Foote
A. B. McIntyre	Midland Prince	J. A. Pickard
G. W. Pearson	Collingwood	H. J. Jack
A. F. MacLennan	W. D. Matthews	Wm. Reid
R. F. Pyette	Midland King	Chas. Leriche
Jas. Reoch	Valcartier	Wm. C. Spencer
R. McIntyre	Martian	Hugh Myler
T. H. Johnston	Sarnian	J. G. McHattie
	Glenmount	

FREIGHT DIVISION—CANAL STEAMERS

Master.	Steamer.	Engineer.
T. S. Patterson	Winona	L. E. Spencer
E. Wilkinshaw	Mapleheath	C. A. Stillson
M. Heffernan	Mapleton	D. S. Simons
A. N. Hogue	A. E. McKinstry	Geo. Fleming
E. J. Shannon	Maple Hill	M. O'Brien
J. A. Ferguson	Vinmount	F. Moyle
W. A. Blackwell	Thunder Bay	A. E. Crosthwiate
N. G. Menard	Maplehurst	A. Dunn
	Hamilton	
C. E. Coons	Simla	F. Lumley
D. H. Porter	India	John J. Dove
N. Legault	Advance	T. Nicholls
J. J. Lawrence	Cataract	Chas. Gray
E. F. Raeburn	Arabian	H. Paus

PACKAGE FREIGHTERS

Master	Steamer.	Engineer
H. A. Patterson	Canadian	A. E. Kennedy
J. L. Baxter	Glenellah	Wm. Keith
Wm. Brian	Kenora	Jas. Douglas
H. A. Leaney	Edmonton	J. A. McDonald
Oscar Wing	Beaverton	F .A. McAuley
K. LaRush	Mapleboro	M. J. Sherman
A. Wilson	Maplebranch	J. H. Louden
Thos. McLeod	Maplebrook	J. A. C. Hawman
D. F. Cornett	Oatland	S. Ashie
A. Francis	Joyland	F. Patterson
O. Patenaude	City of Hamilton	Wm. Dungan
J. A. Lepine	City of Ottawa	G. N. Clark
	Belleville	
	D. G. Thomson	
	H. F. Bronson	

NORTHERN NAVIGATION DIVISION

Master.	Steamer.	Engineer.
A. M. Wright	Noronic	S. Brisbin
H. J. Aitken	Hamonic	Joe. W. McLeod
W. H. Montgomery	Huronic	H. H. Moore
F. G. Moles	Thousand Islander	
W. J. Brown	Rapids King	James Kirk

PASSENGER STEAMERS—EASTERN DIVISION

Master.	Steamer.	Engineer.
N. McGlennon	Quebec	Ovide Bonin
J. A. Simard	Montreal	Nap. Peloquin
Wm. Cornett	Saguenay	Geo. Gagnon, Sr.
J. P. Stephenson	Cape Eternity	Nap. Crepeau
W. Gagne	Cape Trinity	A. Chayer
A. Mondor	Cape Diamond	Geo. Gagnon, Jr.
H. Mandeville	Three Rivers	
Geo. Batten	Longueuil	H. Noel
G. Putnam	Rapids Queen	Wm. Hazlett
	Rapids Prince	G. M. Hazlett

Passenger Steamers—Western Division

Master.	Steamer.	Engineer.
A. E. Stinson	Kingston	Geo. W. MacDonald
E. A. Booth	Toronto	A. Baillie
C. J. Smith	Cayuga	Wm. Taylor
Wm. Malcolm	Chippewa	E. A. Prince
B. A. Bongard	Corona	J. W. Kennedy
Jas. Henderson	Modjeska	C. Kniffen
G. J. Corson	Macassa	J. A. Gunn
	White Star	

GREAT LAKES TRANSPORTATION CO., LTD.

Steamer.	Captain.	Chief Engineer.
Glenshee	W. A. Lavigne	D. Sinclair
Glenisla	J. Tindall	P. Eagles
Glenorchy	E. F. Burke	G. Price
Glenfinnan	Wm. Taylor	J. Silverthorne
Glenlyon	A. A. Hudson	E. Hurl
Glenlivet	C. E. Scott	Robt. Sinclair
Glenstriven	J. A. Brown	G. D. Murphy
Glenbrae	P. Beatty	J. B. Polding
Glencairn	M. Stalker	M. Dedman
Glenmavis	A. McKay	P. Knight

GLEN STEAMSHIPS LIMITED

Steamer.	Captain.	Chief Engineer
Glenfarn	A. Beatty	J. A. McChristie
Glenarm	A. E. Laking	W. Smith
Glendowan	L. Pregent	L. Butler
Glengarnock	No appointment	No appointment
Glendochart	No appointment	No appointment
Glenealy	No appointment	No appointment

ALGOMA CENTRAL STEAMSHIP LINE

Steamer	Captain	Chief Engineer
J. Frater Taylor	J .D. Montgomery	A. H. Chalmers
W. C. Franz	W. C. Jordan	A. M. McInnes
Agawa	M. A. Livingstone	John Smith
Home Smith	A. McIntyre	Duncan McLeod

CANADA ATLANTIC TRANSIT CO.

Steamer	Captain.	Chief Engineer
Arthur Orr	J. Simons	D. E. Mance
Kearsarge	H. Jaenke	J. W. Greiner

IMPERIAL OIL LIMITED

Steamer	Captain	Chief Engineer
Albertolite	J. Colvin	N. B. Gebbie
Calgarolite	W. H. Smeltzer	A. R. Fleming
Imperial	Not yet appointed	Not yet appointed.
Imperoyal	H. C. Mimms	S. E. Brisbin
Iocoma	F. A. McMann	F. Pringle
Iocolite	R. Lain	H. R. Welch
Mina Brea	A. Geddes	A. McArthur
Royalite	Chas. Dyon	C. H. Walsh
Sarnolite	A. G. Cameron	W. L. Hunter
Talaralite	F. F. Foote	D. J. Dow
Vancolite	T. R. Owen	L. Hartje
Victolite	C. R. Treeweek	J. E. Langdon
Barge No. 41	C. H. Harmonson	

ONTARIO CAR FERRY CO., LTD.

Steamer	Captain.	Chief Engineer.
Ontario No. 1.	Chas. E. Redfern	D. L. Smith
Ontario No. 2.	F. D. Forrest	J. Alan Nicoll

MULLEN COAL CO.

Steamer	Captain	Engineer
Alaska	Jos. E. Mahon	Chas. Burns
John Otis	T. W. Layler	Geo. H. Braun
Barge S. J. Tilden	T. Birkeland	

PORT HURON AND SARNIA FERRY CO.

Steamer	Captain	Chief Engineer
Hiwatha	E. M. Thomas	Harvey Myers
Cheboygan	Geo. Waugh	D. B. Smith
Lawrence	Fred H. Bond	John Lavell

MONTREAL AND CORNWALL NAVIGATION CO., LTD.

Steamer	Captain	Engineer
Britannic	Harte	Noé Chertier

GEO. HALL COAL CO. OF CANADA

Steamer	Captain	Engineer
Morrow	R. Chatel	H. Lamoureux
Ignifer	E. Groulx	A. Carrier
Rockferry	W. H. Ransom	M. Parry
Derbyshire	J. B. Gamache	O. Croteau
Follette	C. A. Mahoney	M. J. McFaul
Rugee	A. Barrett	A. Brown
Lehigh	C. Ross	A. E. House
Royan	W. Liddell	T. Aussant
Brignogan	W. Mills	G. Udall
Ketchum	B. Sullivan	O. D. Thurston

DOMINION TRANSPORTATION CO.

Steamer	Captain	Engineer
Caribou	A. A. Batten	J. Walters
Manitou	N. J. McCoy	Wm. Owens

THE ONTARIO TRANSPORTATION & PULP CO., LTD.

Vessel	Captain	Engineer
Linden	Wilson	L. Vipond
Norris		E. Scott

INTERNATIONAL TRANSIT CO.

Vessel	Captain	Engineer
Algoma	W. Griffith	S. Burgess

CANADIAN TOWING AND WRECKING CO.

Vessel	Captain	Engineer
Tug Jas. Whalen	Wm. Nuttall	J. Keenan
Tug A. F. Bowman	B. Burke	H. McElroy
Barge Empire	T. Beagle	
Brge Coteau	Not appointed	

OIL ENGINES IN SCHOONER

The Revillon Freres Trading Co., Ltd., have purchased a wooden three masted schooner of 400 tons deadweight capacity, now under construction at Liverpool, N. S. This vessel will be used to take supplies to the Company's trading posts in the Arctic, and will be away for about four months on this service. She will be installed with a Densil semi-Diesel engine of 100 B. h. p., which should give her a speed of seven or eight knots.

The Densil is a new engine so far as Canada is concerned and is being placed on the market here by The Crude Oil Engine Co. of Canada, of Montreal. It is of the two cycle, low compression type, and this particular model will operate on a consumption of about six gallons of crude oil per hour, which will certainly make this vessel a very economical job to run.

That this engine has been chosen for such a strenuous service, which entails a strict schedule with no allowance for delays, is a distinct compliment to the Danish makers, and we hope in an early issue to be able to describe it in somewhat greater detail.

"VICTORIAN" COMING BACK

It is announced that the Canadian Pacific liners, "Victorian" and "Scotian," which have been in service between England and India, will soon return to the St. Lawrence route.

The two liners were chosen out of many offered for the transportation of soldiers and their families from Britain to India. They entered the service of the British government last fall and have been running continuously since in satisfactory manner.

The liners were completely refitted for the tropical run through the Suez canal, being supplied with awnings, electric fans and other equipment necessary for the tropical services. They are now to be re-conditioned for the north Atlantic service for which they were originally built and the "Scotian" will be among the first liners to dock here this season, her schedule date being May 6. The "Victorian" will follow her on May 21st.

It is further stated that the "Scotian" will replace the Canadian Pacific's Glasgow liner "Pretorian" on the Glasgow service and will be a splendid running mate to the "Metagami" and "Tunisian" which have also been assigned to the Glasgow run for the 1922 season. The "Victorian," an old favorite, will resume her Liverpool run. She was brought to Montreal for the first time last season as a cabin liner, being formerly a first, second and third class passenger carrier in the company's service between Quebec and Liverpool.

Montreal.—The regulation of the port authorities compelling vessels, loading grain, to have their 'tween-deck cargo bagged, is said to be driving business away from this port. The bagging increases the expense of handling considerably, and is not insisted on in New York. The steamer Alcyone, last fall was put to an expense of $5,000 in this connection, and her owners are refusing to accept any more charters from Montreal while the regulation is in force. A petition is being made to the Department of Marine and Fisheries to have the regulation abrogated.

Sault Ste. Marie.—The steamers Hagarty and Glen Isla, which were the first steamers to complete the round trip of Lake Superior this season, reported on their return that ice was still very heavy. On April 23rd they reported that there were about 40 steamers up-bound which had not yet reached open water.

Cleveland.—Advices by wireless to local owners of vessels on April 22 showed that twenty-two vessels up-bound were fast in the ice, while there were a lesser number of down-bound ships in the same fix. The wind, which was from the north at that time, was against their chances of getting free. Some of these vessels had been held up for three days.

Sarnia.—Captain J. Duncan Symes, a well-known lake mariner, died at his home at Corunna recently at the age of 57. He had lived at Corunna for about 27 years, and was largely responsible for its growth as a summer resort. He owned a considerable amount of river front property, and for some years commanded the ferry boat running to Stag Island.

Montreal.—There has been a drop of ten cents an hour in the schedule of wages paid to longshoremen in this port, which becomes effective as soon as the navigation season opens. The day is to consist of ten hours, and the day rate will be 50 cents an hour. Sunday will be paid for at the rate of double time, and also meal hours worked. There will be special rates for special cargoes such as nitrate or bulk sulphur, and grain re-trimming and bagging.

Press Comment On Marine Matters

OUR NATIONAL PORTS

The desirability of promoting the foreign trade of Canada through Canadian ports is so obvious that any proposal having this end in view deserves consideration, but the end may not always justify the means. The suggestion of Mr. Logan, M.P., that the British preferential tariff should be restricted to goods imported direct by vessel to a Canadian port is not novel; on the contrary, nearly a quarter of a century ago Parliament extended to the Government power to impose the policy, section 5 of the Customs Tariff Act being as follows:

"On and after a date to be named by the Governor in Council, in a proclamation published in the Canada Gazette, the British preferential tariff shall apply only to goods brought into Canada by ship direct to a Canadian seaport."

No government has thought proper to employ this authority, and it is not improbable that the subject will continue to be a hardy annual of debate in the Commons without practical result.

The point that the proposal if put into effect may cause retaliation on the part of the United States does not seem to us to have force. If Canada can give a preferential tariff to British goods without producing retaliatory measures by Congress, assuredly Canada can promote trade through her own ports without incurring hostile legislation by her neighbor. The United States has never been sensitive of the feelings of other countries in matters of commerce, nor hesitated to adopt whatever policy was deemed favorable to its interests, the latest example being the ship subsidy bill now on its passage through Congress. No; public apathy on the subject comes, we imagine, from a conviction that better means for building up Canadian seaports can be found than through the medium of the preferential tariff. Imports from Great Britain do not bulk large in either volume or value, and it is the fact that preferential duties on British goods have not caused the extension of trade anticipated when the policy was inaugurated. In 1904 imports from Great Britain were valued at $61,777,000, in 1914 at $132,070,000, and in the twelve months ending January 31st last, at $121,638,000. In the same period imports from the United States rose from $150,826,000 in 1904 to $410,786,000 in 1914, and in the twelve months to January 31st were $537,084,000. The foreign commerce of the port of Montreal attained its greatest proportions in the season of 1921, yet in respect of volume of imports the figure was the smallest in many years. In the nature of things the maritime ports, Halifax and St. John, struggle under the handicap of a short season, not more than five months with regard to westbound ocean traffic, and if during that period all British goods enjoying the preferential tariff had to be landed at one or other of these ports, the impetus to trade would be slight. Whether the preferential tariff is, in itself, enough to assist the import trade from Great Britain is another matter, and it is by no means certain that what the importer would gain in duty he would not lose in higher cost of land carriage.

It is a commendable purpose to build up Canadian ports, in which connection the Canadian Pacific Railway has pursued patriotic policy. If St. John has become the winter port of Canada during the five months of closed navigation on the St. Lawrence, it owes the fact to the enterprise of the Canadian Pacific in constructing a short line to that port; and if St. John is to develop as a national winter port of Canada, its development will depend principally upon adequacy of facilities and favorable transportation rates. And what, then, is to become of our other national port—Portland, Maine, U.S.A.? Is that winter terminus of the Grand Trunk division of the Canadian National Railway System to be allowed to run down at heels? Or is it intended to promote traffic through this American port in competition with Halifax and St. John, and to the disturbance of the maritime peoples? It was apparently forgotten, perhaps unknown, when the Grand Trunk was purchased by the late Government, that this is more an inter-National than a National road, deriving the larger part of its income from American traffic, so that to abandon Portland means to abandon during five months of the year the best part of the Grand Trunk business. Moreover, if the policy of restricting the preferential tariff to goods imported by ship to a Canadian port was adopted Parliament would be in the paradoxical position of legislating to the injury of its own property. It is frequently judicious to let well enough alone, but bad enough cases call for remedy, and if the maritime ports are to be aided in foreign commerce, the Government should separate the Grand Trunk from the National system and restore it to private ownership. —Montreal Gazette.

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A MISLEADING STATEMENT

St. John and Halifax would do well to consider seriously the return presented to Parliament a few days ago, which is calculated to create a national impression that a greater amount of public money has been spent on this port than on any other Canadian port, and that Halifax has been a good if not a close second. That is not exactly what the report stated, but that is the conclusion the general reader is likely to reach. Parliament appears to have been told, according to press despatches, that "more money has been expended by the Department of Public Works on harbor improvements at the port of St. John, N.B., in the last twenty years, than at any other two ports in the Dominion." It is revealed by the figures that the public works and railway expenditures on the St. John and Halifax harbors during the twenty years were:

	St. John.	Halifax.
Pub works.	$16,776,025.33	$1,770,227.38
Railways . .	354,032.69	9,914,315.91
	17,130,058.02	11,684,543.29

No figures are given in the press reports of railway port expenditures at other Canadian ports, but the public works expenditures at Montreal are stated as only about one-quarter of the St. John expenditures and one-third the Halifax expenditure. It is no doubt true that the St. John harbor expenditure to date is a little over $17,000,000, and the Halifax expenditure a little under $12,000,000, but it must be remembered that these two amounts represent the total of all government expenditures on these national harbors, while the four and a half millions credited to Montreal is exclusive of the many millions given to the Montreal Harbor Commission and used by that commission in harbor work. No comparison of the national expenditure on national harbors fairly states the facts, which tends to create the impression that harbor assistance given St. John or Halifax is greater than that given Montreal. A comparison of expenditures to be worth while should show all that the country has put into harbor work in various Canadian ports. Such a statement would show the maritime ports in an altogether different light—would make it plain that they have not been the chief recipients of government aid.—St. John Globe.

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EMPIRE COASTWISE TRAFFIC

British shipping circles are strongly opposed to any State subsidy of shipping, and the legislation now before Congress for a subsidy to the United States merchant marine arouses their ire. One London shipping journal proposes that if the Washington Government carries out the subsidy project, Britain should arrange with Canada and the other Dominions for a special preference to Empire shipping. The Jones Act, now held in suspense, proposes to declare traffic between the United

States and the Philippines to be "coastwise," and therefore open only to American ships. If traffic between Britain and the Dominions were declared to be "coastwise"—which is only a similar principle—and open only to British ships, there would be the makings of a fine international row. But, fortunately, even the operating of a $50,000,000 subsidy cannot put the United States merchant marine permanently on its feet. The only permanent basis is ability to meet competition and give service. The Seamen's Compensation law, and the dwindling of American traffic with outer parts of the world, should keep a large sea-borne commerce out of the the seas. This 10,000,000 tons is probably useless for all time. The course of the United States in respect of tariff exclusion of imports of all kinds, the taxation put even on buyers, the inability of Europe to finance further cash purchases, and the necessity of Europe making heavy annual interest payments to New York, will all operate against a large sea-borne commerce out of the United States. Before the war, American opinion regarded the home market of 100,000,000 as eminently superior to all foreign markets put together, and even the taste of foreign trade enjoyed during the war period has not destroyed this belief. Production, finance and living are so much harder and leaner in Europe that once that Continent regains something of its normal economic position, the United States will lose most of what remains to it of its war-won trade.—Toronto Daily Mail.

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THE PORT OF QUEBEC

It is very sincerely to be hoped that the lesson of the limitations of the port of Montreal which was only learned by it last year at an extremely late date, when it had become glutted with more business than it could handle, will not be lost upon it this year, and that shippers will in consequence start earlier in the season this year than they did in 1921 to divide their shipments and to see that no more erroneous impressions should be allowed to prevail in shipping circles in regard to the accommodation that is available for grain shipments by the ports of the Lower St. Lawrence. It is consequently very gratifying to find in a recent number of the "Shipping and Exporting Register of Canada," the following reference to the conditions of last season in Montreal's port: "It will be recalled that the congestion of grain last fall in the harbor of Montreal became so acute, and the delay in delivery so great resulting in broken delivery contracts, that for some time Great Britain stopped all shipments and suspended purchases. Then when the railways saw that it was impossible for Montreal to handle their grain they just absorbed the little additional freight charge between Montreal and Quebec, and took the grain to Quebec, where as stated above, they were successful in placing 4,000,000 bushels on shipboard before the close of navigation. In spite of the freight rate Quebec is entitled to a part of the grain business. Would it not be within the power of the Dominion Railway Board or the Grain Board or both, to designate that a percentage of the grain coming east by rail shall go direct to Quebec? here should be no time wasted by those who are interested in the future of Quebec Harbor in seeing that action along these lines be taken at once." Our contemporary deals as follows with the railway freight feature of the situation: "Immediate steps should be taken to see that this port is not in any way discriminated against by the railways, and that equitable rates for the shipment of grain be maintained so that the facilities for this port can be placed in action. There is a very little difference in the rail haul on grain from the west between the ports of Montreal and Quebec. So little, in fact, that last year, when the congestion in Montreal was blocking the foreign market Quebec was finally called into action and in about three weeks they succeeded in handling 4,000,000 bushels. This was accomplished in spite of the fact that for several years previous they had handled no grain and consequently their staffs had to be reorganized. This year there is an aggressive management at the port of Quebec, and we may expect to hear from them if they are not given a fair deal. The port of Quebec has many advantages, and it is not the purpose of the new commissioners that it is used as an auxiliary to the harbor of Montreal."—Quebec Telegram.

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ONTARIO AND THE SEA

The apathy of the people of Ontario regarding the deepening of the St. Lawrence waterways is astonishing. Were the channel from Lake Ontario to Montreal so improved as to provide a navigable depth of twenty-five feet instead of the fourteen now available, almost every important industrial centre in this province would either become a seaport, or would be within easy motor truck haul of a seaport. Old Ontario is almost surrounded by navigable water. Lake Ontario, Lake Erie, Lake Huron, the Georgian Bay and Lake Superior provide facilities for the carriage of goods by vessel during eight months of the year that exist in an inland region nowhere else in the world.

This province, in sober truth, is an island in the heart of a continent, and should be striving mightily to secure every possible advantage from its unique position. Instead of doing so, many prominent business men regard the deepening of the St. Lawrence waterways as a matter in which the west is chiefly interested as a means of cheapening the cost of grain and live stock shipments to Europe by cutting out the cost of transferring cargoes at Montreal from lake carriers to ocean-going steamships. They listen sympathetically to the assertions of the opponents of improvement that ocean navigation is a very different thing from lake navigation, that the type of vessel suitable for the one would not be economical for the other, and that in any event it would be much more difficult to obtain return cargoes for interior ports than for Montreal or Quebec.

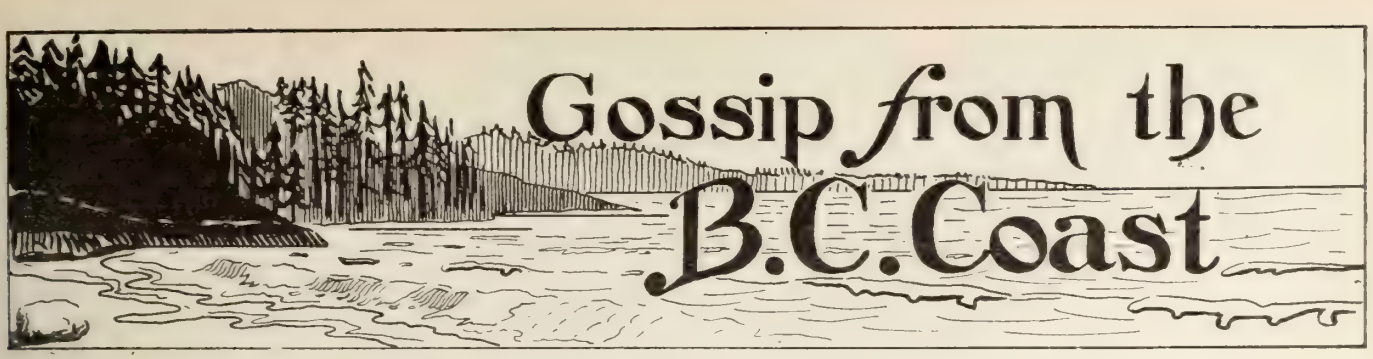
These objections do not hold water. No one talks of bringing ocean liners into the Great Lakes. Cargo vessels capable of use on both the ocean and the lakes could be designed and built as readily as vessels for use exclusively on the ocean or the lakes. There would be marked advantages in owning such ships instead of the ordinary type of lake freighter, which is tied up in December and earns nothing until April, or May, on the opening of inland navigation. The double-purpose ship could go down to the sea in the fall and look for cargoes along the Atlantic coast, or in the Central American trade, during the winter.

There is little in the objection that lake and ocean types must be essentially different because they have dissimilar work to do. The navigation of the St. Lawrence between the Isle of Orleans and Montreal is river navigation, differing little in length or in any other respect from the navigation of the upper river between Lachine and Kingston. Modern canals at the Soo, between Lake Erie and Lake Ontario, and on the St. Lawrence rapids, will interpose no obstacle to either lake or ocean-going vessels. The canals are relatively short, and the locks will be few. Conditions will be such as to make for a minimum of delay and cost as compared with that involved in transhipment at Buffalo, Montreal and New York.

Mr. W. L. Saunders, an eminent American engineer, whose report on the St. Lawrence deepening was published yesterday, says of the cost of carriage by the Buffalo-New York route:

> The record of experience shows that for every dollar which the producer in the west pays to ship his products from Duluth to Liverpool, more than 40 cents is consumed in the territory between Buffalo and New York. This expense is due partly to charges for unloading and reloading, commonly known as breaking bulk, and partly to the high cost of transportation by rail and canal.

The enemies of the improvement of the St. Lawrence waterways are exceedingly active, particularly in New York State and along the lower St. Lawrence. Ontario cannot afford to play the part of an onlooker or a neutral in a contest that so intimately affects her own crusade for deeper waterways. In that crusade the Legislature, the Municipal Councils, and the Boards of Trade in all that portion of the province bordering on the Great Lakes should take a vigorous and whole-hearted part.—Toronto Globe.



CANADIAN and American shipping companies operating in the Pacific have reached a general agreement that will probably forestall a threatened rate war. When the lumber rate tumbled from around $15 to less than $10 there was a general scramble for space and the Japanese lumber trade showed a strong revival. There was every indication that shipping companies would start an aggressive cut-throat competition, and there was additional evidence to the same general effect when the wheat flour rate declined from $6 to $5 a ton. General merchandise was reduced to an average of $2 a ton. Most of the companies have now come to terms, however, and it is probable that the market will soon become fairly established. The appearance of tramp steamers after a long absence was one factor which had an important influence in bringing the regular carrying companies together.

By an agreement recently reached between all trans-Pacific passenger lines, Atlantic steamships operators and transcontinental railroads both in Canada and the United States, a uniform through passenger rate from the Orient to Europe has been established, and travel by way of this continent put on a parity with transportation via the Suez Canal route. The companies which have joined in this agreement are the Canadian Pacific Steamships, Ltd., Pacific Mail Steamship Company, Toyo Kisen Kaisha, China Mail Steamship Company. Stopover privileges have also been provided as an added inducement to travel.

The Robert Dollar Company has offered to purchase twenty of the best freighters of the United States Shipping Board fleet, according to reports current here. Thirty dollars a ton was offered. Although it was revealed some time ago that such a proposition had been made to the Board, the name of the bidder was not disclosed until a few days ago. Capt. Robert Dollar, veteran head of the international shipping concern, addressed the foreign trade bureau of the Vancouver Board of Trade recently and predicted that the centre of the world's commerce would shift from the Atlantic to the Pacific within the next ten years.

Making the forty-second ship to pass into Japanese hands this year, the steamship Melville Dollar, well known in Pacific trade routes, has been sold to the Kishimoto Kaisha, of Kobe. The Melville Dollar was the first vessel built for the Robert Dollar Company. She was laid down at Glasgow in 1905 at a cost of about $135,000. She has a registered net tonnage of 2,804. Among the British ships sold this year to the Japanese were three of the Harrison Direct Line fleet—the Tactician, Historian and Magician.

The terms reached by the rate conference at Portland, Ore., April 13, which is believed to have ended the possibility of a long-drawn-out battle between rival trans-Pacific lines for freight business provide for a rate of $12.50 a thousand feet on usual run of lumber, $11.50 a thousand feet for small sizes, $17.50 on logs, and lengths more than forty feet long will be covered by special contract. Wheat and flour are quoted at $5 a ton. It is expected that all the shipping companies will subscribe to this agreement. Although the Canadian Pacific and the Blue Funnel Line were not represented at the conference, it is believed that they will confirm the agreement. It is probable that rate committees will be organized at important shipping centres along the coast with secretaries for the purpose of maintaining the schedules decided on and dealing with other matters relating to trans-Pacific cargo business.

Victoria and Esquimalt have started a determined fight against the proposal of the Federal Government to discontinue the construction of the Esquimalt drydock, laid out to be the largest in the world. Work has ceased and the cost of proceeding with the project is not included in the year's estimates. The Government gives the desire for economy in all expenditures not strictly essential as the reason for closing down on the work. Victoria trade interests have entered a strong protest and Vancouver Island members are pressing for a reversal of the policy laid down by those who framed the estimates. They hold that about $1,250,000 has already been spent on the job, and that to abandon the work now would mean a further outlay of about two millions to the contractors, Peter Lyall & Sons, and others for the plans made and materials purchased for future construction. In fact, it is maintained by some investigators that if the project is stopped at this juncture and is not continued the Government stands to save only $750,000 after already expending more than $3,000,000 for doing nothing more than some worthless rock excavation, whereas if the Government continues with the work it will spend $750,000 more than is now necessary and at the end have a drydock second to none on the Pacific coast. Whether these figures are accurate has yet to be proven, but they were regarded as close enough to the facts to be given out by the Victoria Chamber of Commerce. A political delegation composed of Hon. John Hart, provincial finance minister; Henry G. Hall, K. C., William M. Ivel, all of Victoria and T. B. Booth, M. P. for Nanaimo, are now in Ottawa, urging that the work be resumed.

Capt. Robert Dollar was one of the leading delegates at the conference. Others from San Francisco were J. G. Stubbs, of the Java Pacific Line, and W. K. Sempey, of the China Mail. B. C. Keeley, British Columbia agent for the Canadian Government Merchant Marine, was the only Canadian delegate present. From Seattle were F. H. Glendenning of the Canadian Pacific, S. Ogata of the Nippon Yusen Kaisha, John G. Gorman of the Admiral line, T. A. Lee, Furness-Withy & Co.; J. R. Walker of the Walker-Ross company; W. J. Chalmers of Jas. Griffiths & Sons, A. Kinney of A. M. Gillespie, Inc., K. Yuchida of the Yamshita Kisen Kaisha, S. Sasaki of Mitsui & Co., R. T. Johns of R. T. Johns & Co. From Tacoma was G. H. Wagner of the Osaka Shosen Kaisha. Portland delegates included W. T. Sexton of the Columbia Pacific Shipping company, R. T. Johnstone of Statter & Johnstone, J. W. Crichton, division of operation of the shipping board; G. R. Theirling, with A. M. Gillespie, Inc., and representing the Yamshita service; C. E. Harvey of the Toyo Kisen Kaisha and T. Ronner of Suzuki & Co.

It is still unsettled whether the Canadian government will take over the Prince Rupert drydock, although the Canadian National Railways have promised to make use of the dock for repair of their steamships whenever possible.

J. H. Pillsbury, manager of the dry-dock, returned recently from Toronto, where he conferred with D. B. Hanna, chairman of the board of management of the C. N. R.

Through passenger rates of $620 from the Far East to Europe via trans-Pacific steamships and Canadian and American continental railroads has been established effective as from April 1, thus putting the North American route on a parity with the Suez Canal for passenger traffic. The trans-Pacific companies which have established the new rate are the Canadian Pacific Steamships, the Admiral Line, Pacific Mail Steamship Company, the China Mail Steamship Company and the Toyo Kisen Kaisha.

Malcolm J. Woods, for some years purser of the Grand Trunk Pacific steamship Prince Rupert, has been appointed traveling passenger agent for the Canadian National Railways under Charles Jenney, general agent at New York.

The power schooner, Jessie, one of the best known vessels of the old North Pacific sealing fleet, was sold recently by Andrew Bechtel to Chinese cannery interests in Vancouver. The Jessie was at one time used as a pilot boat in San Francisco harbor and later was engaged in the freighting business between Hawaiian Islands and California.

Because the Empress of Canada was unable to attain the speed standard specified, the big liner has been turned back to the owners by the Canadian Steamships, Ltd., for readjustment. The Empress of Canada was scheduled to leave London for the Pacific early in April. She is a steamship of 19,300 tons. A sister ship, the Empress of Australia, is scheduled to make her first trans-Pacific run from Hongkong to Victoria and Vancouver July 27. The Empress of Australia is practically a new ship, having been in the builders' hands at the beginning of the war. She was recently converted into an oil-burner. She is 590 feet in length, has a 75.5 breadth and 41.5 depth. She is equipped with engines capable of developing a speed of twenty-two knots.

Hope is held out by Hon. Dr. Beland, Federal Minister of Health, that an anomaly as between the United States and Canada in the medical inspection of ships may soon be removed. At present the Canadian authorities accept the United States medical health certificates of ships coming into Canadian ports. On the other hand Canadian certificates are not accepted in the United States. Arrangements are now being made for a reciprocal agreement in this matter between the health departments of the two countries.

A ferry service has been inaugrated between Anacortes, Wash., and Sidney, Vancouver Island. The principal feature of the service is the accommodation for automobile touring parties. The vessel will have accommodation for thirty cars.

Six new steamships aggregating 26,000 deadweight tons will be built this year by the Osaka Shoshen Kaisha, according to advices received here. During the latter half of 1921, one hundred and fifty-four steamships, aggregating a total of 447,780 tons, were operated by the Osaka Shoshen Kaisha on forty-eight different routes.

Although officials of the Shipping Federation and of the International Longshoremen's Union say that no trouble is anticipated over the new agreement which is now being negotiated, there have been rumors lately of a new strike of British Columbia freight handlers, not over wages, but as a result of working conditions specified in the agreement. The men are satisfied with the 80 cents an hour straight time and $1.20 an hour overtime, but they object to the proposed stipulation that checkers and foremen be appointed by the shipping companies without reference to the Longshoremen's Union. Under the old system the foremen and checkers had to be members of the union.

The Pacific Steamship Company, Admiral Line, will shortly open new offices in Victoria. In the past the business of the company at this port has been handled through Rithet Consolidated, but the growth of the trans-Pacific business of the shipping company has made the establishment of independent offices advisable. William Allan, who has represented the company's interests in Victoria for many years, will continue as manager of the office.

The Admiral Line will use the new Federal docks in Victoria instead of the Rithet docks as in the past, according to General Passenger Agent Edward B. McMicken, Seattle.

ROUND THE WORLD

Starting on the "last leg" of their trip around the world, Capt. J. L. Watson, of Cardiff, Wales, and Capt. O. Richards, of Cambourne, England, will sail from St. John for Liverpool on the Canadian Pacific Empress of Britain.

Capt. Watson and Capt. Richards, with eight officers of the S.S. Pencisely and five officers of the S.S. Mull, arrived in St. John from Vancouver on the Empress of Asia, on her recent record run from Yokohama to Canada. They are all en route to their homes in England, after having delivered these vessels at Kobe, Japan, where they were sold to Japanese buyers.

Both steamers sailed from England with cargo, and proceeded to their ultimate destination by way of the Suez Canal and the Red Sea. The Pencisely discharged a cargo of coal at Port Said, and took on salt, with which she proceeded to Kobe, Japan, where she arrived on March 7. The Mull carried coal to Torrevega, Spain, and there took on a cargo of salt, with which she proceeded to Kobe, arriving there at approximately the same time as the other vessel.

In discussing conditions in Japan, Captain Watson expressed the view that a period of depression seemed to prevail, business being by no means in a flourishing condition. He said that there seemed to be a scarcity of money in the country, and that there was a great deal of unemployment. Asked regarding the reason for purchasing of British ships by the Japanese, he said that the shipping men there figured that they could buy from other countries cheaper than they could build, on account of the heavy sur-tax imposed by the Japanese government. Captain Watson also said that, within the last few months, there had been a great demand for freighters on the part of the Japanese, forty-two British ships having buyers in that country. The captain was unable to account for this demand, especially in view of the conditions prevailing in the country, but he stated that the new owners of the vessels, lately delivered, had immediately set to work remodelling them and that they were now plying in the Indian and African trade. He said that when he left Japan the people were all anxiously awaiting the arrival of the Prince of Wales in that country, and his proposed visit was being looked forward to with keen pleasure, on the part of the Japanese. According to Captain Watson, the Japanese express great admiration for the Prince, and, on his arrival in Japan, he will be accorded a most hearty and hospitable reception.

A TALE OF THE SEA

An extraordinary tale of Bolshevism and mutiny at sea, of the growth of "the spirit of freedom" among the Japanese crew of the steamer "Strudsholm" until the boatswain and the head stoker walked the bridge while the British officers were in daily expectation of "walking the plank," was brought to Canada by the Canadian Pacific S. S. "Empress of Japan," which has just left on a return trip to the Orient. Smacking more of the days of Captain Kidd than of these well-ordered times, it would be incredible were it less well authenticated. The captain and officers of the "Strudsholm" arrived at Kobe while the "Empress of Japan" was at that port, where the recital of their experiences aroused a storm of comment that swept the whole Orient. There was nothing to fear from Bolshevism enter-

ing the country from outside, it was felt, while men like the crew of the "Strudsholm" were at large in Japan.

The "Strudsholm," it seemed, after purchase from British owners by the Yamashita company, left Cardiff in October, 1921, with British officers and a British first engineer, the rest of the crew being Japanese. From the outset there was trouble, and short of scuttling the ship there was little in the way of mutinous conduct that the men did not attempt. Duties of all kinds were refused or shirked, the sailors taking turns to be "ill" for three or four days, showing no symptoms and declining al attention.

As the voyage neared its end, it was decided to navigate the ship to Manila, whereupon the crew, led by the boatswain and the head stoker, threatened the officers, who had no arms, and compelled them to alter their course for Japan. They tried to make Kudat, Borneo, with a similar result. When attempts were made to signal a lighthouse it was found that the flags were in the boatswain's room and could not be obtained.

On January 25, the head stoker and the boatswain paid one of their important visits to the bridge and ordered Captain W. Frost to put into Takao, Formosa, in order to get medicines for the donkeyman, who was sick. If the master did not obey their behests, they promised that the donkeyman would die and that the captain would have to stand his trial for murder. So they laid a course for Takao. When the ship entered the Formosan Channel, a sailor, who for days had been suffering from the peculiar ailment that needed only rest and no medicines, visited the bridge and told the officer on watch that he was going on the wrong side of the island—that the East side was much better. The narrator naturally wondered what would happen to a sailor of any other nationality for such an offence, but the Japanese seem to be able to "get away with it." Earlier on the voyage there had been another instance of imperfect combination among the crew, when the boatswain knocked a man down on his second attack on the captain with a knife. The first assault had resulted in a trifling cut on the hand.

The boatswain was the obvious ringleader of the mutineers according to the account brought by the "Empress of Japan," and, as there were no arms and the British officers were helpless, they tried the experiment of promoting him to third officer, to see whether that would make less of a Bolshevik and put him on the capitalist side. To certain extent this succeeded, as he immediately demanded a good cabin and a seat at the officers' table. Not getting these, he became more unruly than ever. On entering Takao harbor, Mr. J. Roberts, the first officer, ran up the international pilot-call flag, but was ordered to haul it down and run up the local "S" flag. As this came to the same thing. It was done to save further dispute, the boatswain, however, warning Mr. Roberts that if he came forward with any orders to the crew he would be killed.

At Takao, Mr. Roberts took the opportunity of visiting the British Consul at Tamsui, before whom he laid the facts. Captain Frost and Mr.. Roberts refused to proceed unless the ringleaders were taken from the ship and the boatswain and head stoker were arrested. The Japanese police, however, soon came to the vessel, explaining that everything had been amicably settled and that the mutineers would sail and obey orders. Needless to say, when once clear of the harbor they were as insubordinate as ever.

There was still one more adventure in store at Keelung, where one Hari, a ship chandler, representing the firm of brokers through whom the ship was brought, told the European officers and engineer to come ashore and put up at a Japanese hotel until they could be sent on to Japan by another ship. For some unexplained reason, Hari threatened Mr. Roberts with a knife when he did not immediately fall in with his wishes. However, things have been moving since the Takao adventure, and at Keelung a new Japanese crew arrived and took over the vessel. The four Europeans reached Kobe as passengers on another steamer late in February. Some of the mutineers also arrived at Kobe, but had apparently committed no offence in Japanese law as they were left at liberty to go and do likewise on any other ship that would take them.

Considering the traditions of the sea, the whole tale is almost incredible. Yet the half has not been told. For weeks for instance there were only four men willing to take a turn at the wheel. Often the helmsman did not wait for relief, but simply left the wheel and walked forward, the officer being awakened to the fact by the ship coming round. Even a Chinese on board became infected with the spirit of freedom and refused to see to the lights unless he was paid overtime. The demand for payment in advance for overtime was one of the favorite responses to an order, and anything that the crew did not want to do was overtime. There was seldom a man on lookout, and what with this and with such stoking as only to make two knots an hour, the ship was in considerable danger from the insubordination of the crew. It seems strange that Japanese owners should be satisfied to permit incidents as this. The law, however, had done nothing in the case up to the time the "Empress of Japan" left Kobe for Vancouver.

MANY CANADIANS ON MEDITERRANEAN

Completing an unusually interesting cruise to the Mediterranean, the Canadian Pacific Empress of Scotland arrived at Havre on Friday last and Southampton on Saturday morning. She left New York on February 4th, and in the course of the tour the passengers visited Madeira, Spain, Gibraltar, Algiers, Greece, Turkey, Palestine, the Holy Land, Egypt, Italy and Monte Carlo.

Among the Canadian passengers who made this cruise were Miss E. M. Cummings, Montreal; Mr. and Mrs. George R. Gray, Sault Ste. Marie; Mr. and Mrs. R. A. A. Johnston, Ottawa, Ont.; Mrs. Benjamin Kent, Toronto, Ont.; Mrs. K. Rayson Kerr, Toronto; Mr. and Mrs. Ralph King, Miss Margaret King, Toronto; Mr. Henry Meade, Toronto; Miss Charlotte Miller, Chatham, Ont.; Mr. W. H. McCordick, St. Catharines, Ont.; Mrs. Ira Standish, Toronto; Mrs. G. Symington, St. Thomas, Ont.; Miss Margaret Walsh, Toronto; Miss Mary Weir, Dundas; Mr. Joseph Wright, Miss Josephine A. Wright, Toronto.

Some of the passengers are returning to Canada on the Melita, which is due at St. John next Monday. Others will return on the Empress of Britain, which sails from Liverpool on April 11, while most of the cruise passengers will return on the Empress of Scotland, leaving Southampton on April 22nd, via Cherbourg. Her arrival in Quebec will inaugurate the new Canadian Pacific Empress express route to Europe, which will be maintained by the finest, biggest and most luxurious steamships from any Canadian port, the Empress of Scotland, 25,000 tons, and the Empress of France, 18,500 tons, between Quebec and Cherbourg, Southampton and Hamburg.

By way of the sheltered St. Lawrence River, with only four days on the Atlantic, this new service offers the shortest and most comfortable route, with express rail connections to the chief cities of Great Britain and the Continent, to London or Paris in a week, and to Berlin in nine days.

In addition, the Empress of Scotland and the Empress of France, will maintain the trans-Atlantic service in the Orient-to-Europe system which commences with the Empress of Scotland sailing this coming month from Quebec. The Canadian Pacific by means of its fastest and finest trains and steamships will link the Orient and Europe, via Canada, making the most complete and important service of this kind in the world. The new Empress of Australia and the Empress of Canada will maintain the trans-Pacific service.

A RECORD CASTING

The largest iron casting ever made in Great Britain and one of the largest ever produced in any country was recently turned out in a British factory. It weighed about 110 tons and the mold was built in a 16 foot pit. Seven hours were occupied in melting the metal, and the casting was poured in just under five minutes. Three weeks were occupied in cooling the casting. Owing to its enormous size and weight the casting had to be delivered by road, six traction engines being used for hauling it.

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Inter Port Rivalry.

IT IS INEVITABLE that when two ports are situated on the same waterway and within a short distance of each other, that there should be a keen rivalry for business. This is in itself a healthy state of affairs, and makes for efficiency at both ends. It is somewhat of a pity that the feeling of rivalry should be accompanied with a certain amount of bitterness, but in some cases that appears to be the condition arising.

The port of Quebec which is situated somewhere about 200 miles nearer the sea than Montreal, feels that it is unjustly discriminated against by the railway rates on the Government railways, in the carriage of grain. They feel that having the facilities for loading grain at the port, and being in direct rail communication with the grain growing districts, they should have a share of the traffic.

While there is nothing unreasonable in this attitude, and while it is true that the Government has money invested in the harbour of Quebec, the fact remains that the Government railways are being operated at a loss, and if the rate to Quebec was made the same as the rate to Montreal the loss would have to be absorbed by the railways, or in other words the taxpayers. Quebec gets the benefit of the emigrant trade, which is denied to Montreal. As for the rest, it is a case where the port authorities must make their port attractive to shipowners or charterers sufficiently to get a fair share of the business of the St. Lawrence, without the help of preferential railway rates.

What Is Coastwise?

THE IDEA of including an ocean voyage of thousands of miles in the so called coastwise traffic of the United States is one that could only emanate from the minds of politicians trying desperate remedies for a desperate disease.

The Washington Government in the propose shipping subsidies, suggest that vessels trading from the United States to the Phillipines should be included in the coastwise traffic, as they are trading from one part of the United States to another. This ruling would make it impossible for any vessel not flying the U. S. flag to carry a cargo from the United States to the Phillipines.

The whole tenor of the Jones Act, which is still in a state of suspension is to make business for the U. S. shipowner by rigidly excluding the ships of every other state. As we have pointed out before, if the Governments of the various British Dominions and the United Kingdom should introduce retaliatory legislation, it would have the effect of excluding U. S. ships from most of the ports of the world. They are hardly likely to do this, as under present conditions of operating costs, U. S. ships cannot well compete even with the help of subsidies. Shipowners will not run ships for any length of time for the purpose of being patriotic alone, and the great body of taxpayers in the U. S. who are absolutely unacquainted with ships or shipping, will before very long become tired of paying taxes to support a special industry. The politicians in the neighboring country still think with parochial minds, although they claim to be the representatives of a world state. They want the U. S. to be in the position where she can sell to all the world and reap the profits, at the same time keeping all her own money intact by refusing to purchase abroad. They want to make it so that anybody wishing to ship goods to their country will have to pay high freight rates to have their goods carried in U. S. ships, and when they reach there pay an enormous duty, so that when they finally get their goods on the market, they will be at a price that will preclude their purchase by any American citizen.

How they expect to get cargoes for their ships under these conditions it is hard to say, and how they expect to retain an export trade under such conditions is also difficult to realize. As a matter of fact the export trade that the U. S. built up under the disabilities of their rivals is about wiped out, and internal economic conditions are such that there is little credit coming to the tariff manipulators and amateur statesmen who have been trying to establish an economic Utopia.

Navigation Is Opened.

THE NAVIGATION season of 1922 is opened, and the fleets of the Great Lakes are going to and fro on their lawful occasions. Several ocean liners are on their way to the St. Lawrence for the first time this year. The great harbor of Montreal, and the smaller but no less efficient port of Quebec are prepared to receive their visiting argosies, and thousands of unemployed men will soon be earning wages again for the first time in months.

The season on the Great Lakes has not been opened without loss of property and loss of life, and it seems to be almost inevitable that the opening and closing days of the season should be marked by disasters. While the casualties of the end of the season are usually caused by high winds and heavy seas, those of the beginning are most attributable to the presence of the winter ice, which nips the early wayfarers, and in some cases, destroys them.

It seems to be an ironical joke on the inhabitants of Canada and the states bordering on the lakes, to provide them with the finest inland body of water in the world, and then to seal it fast for about half of the year. That fact remains, and all the arguments in the world will not alter it. The proponents of the deep waterway scheme seem to think that this is a small obstacle. It seems to be a sufficient one to make the scheme an impossible one, from the point of view of ever being a paying proposition.

The Still System of Internal Combustion

The Author Shows That the Still System Can be Applied to Any Type of Internal Combustion Engine Without any Radical Alteration. The Mechanical Features Are Also Dealt With

By F. LEIGH MARTINEAU.
Transactions of the Institute of Marine Engineers.

IN THE course of conversations, the author has found that there exists in the minds of some people an erroneous impression of the system dealt with in this paper. It is imagined that it is necessary for an engine, if it is to operate on the Still System, to be of a particular type; this, however, is not the case, for any type of internal combustion engine can, by the modification of a few details in certain vital parts, be made to operate upon the Still System, and by this change improve its results by at least twenty per cent.

For instance, many here present have no doubt at some time or another been closely in contact with some particular make of Diesel engine. The modification of the designs of such an engine could enable it to be built upon the Still System whilst at the same time it could retain all of its original characteristics, such for example as compression pressure, system of valve operation and system of fuel injection, etc. It would then, if made the same size give at least 20% more power with the same fuel consumption or it could be of smaller size, and use less fuel and yet develop the same power.

Whether such a change would be advisable in its entirety is a matter for consideration, as one of the advantages possessed by the Still System is that it enables an engine to be built, in which certainty of ignition of its fuel is obtained with a lower compression pressure than is normal, and yet on its combustion cycle, an indicated thermal efficiency can be obtained with this reduced compression pressure, as high as is available from a normal cylinder with a higher compression pressure, this effect being due to the lower heat losses through the cylinder walls in the Still System.

Considered from a commercial and running point of view, it is contended that under these circumstances it is often advisable to make engines operating on the Still System with a lower compression pressure than is normally required and not to aim at obtaining the greatest possible efficiency, but rather to have in view an engine with the lowest upkeep cost.

Even under the conditions suggested:

(1) Certainty of starting is maintained.

(2) A high combustion thermal efficiency is obtained.

(3) A lighter scantling can be adopted, as the maximum pressure which can be accidentally developed within the cylinder depends upon the compression pressure.

It may be well here to briefly state the general features of the Still System, in order that it may be quite clear to those who are not yet acquainted with it.

Its essential features are:

(1) A combustion cylinder in which a piston operates.

(2) A water jacket surrounding this cylinder maintained by the heat wasted which passes through the cylinder walls at a temperature equivalent to a certain steam pressure.

(3) A regenerator circuit with the jacket and through which the combustion exhaust gases are passed to give up the heat to the contained water.

(4) Steam is generated therefore both by the heat wasted through cylinder walls and contained in exhaust gasses.

(5) Such steam is supplied to the cylinder by suitable valves, and operates upon the under side of the combustion piston.

(6) It will be seen that an engine upon the system is double-acting and a combined combustion and steam engine partaking of the characteristics of each.

Smaller Heat Losses

As has been already stated, the heat losses to the cylinder walls are less than in a normal engine, this is because the temperature of the cooling water within the jacket is that due to the steam pressure adopted, i. e., at 150 lbs. per sq. in. 366 deg. F.

The effect of these smaller losses, causes the indicator card to show a gain in area on its expansion which is higher at the time of release than in a normal card. The result is a higher mean effective pressure for a given fuel consumption and a slight increase in the percentage of the fuel heat turned into work on the piston.

Besides this, the temperature of the exhaust gasses at the time of release is higher, and steam is more easily raised in the regenerator, i. e., from a smaller surface, than would normally be the case.

The quantity of heat, small though it unfortunately is, which does pass from the combustion cylinder to the jacket water is very valuable as it raises steam at 100% efficiency there being no loss, except that due to outside radiation, which obviously has only to be deducted from the steam after it has been formed by the heat transmitted.

When steam is raised in a normal boiler the actual efficiency is greatly reduced by air leaks into the furnace and even through the grate, and considerable difficulty is experienced in maintaining a high efficiency.

The exhaust gasses passing through the steam generator attached to a Still System engine however, do not suffer from this trouble, except only in case of a two-stroke engine which is over scavenged, and as they pass at high velocity over the boiler surfaces they can the more readily give up their heat to such surfaces. The result is that the efficiency of steam raising is high in the exhaust as generator.

These two facts together result in the combined steam raising efficiency of both the jackets, and generator being very high, much higher than is possible in a normal boiler, and as a consequence the maximum quantity is available from otherwise wasted heat.

Having obtained steam as an extra profit without having to consume additional fuel, it is obvious that it should be utilised in the most economical manner.

The whole combustion engine, cylinder and pistons are already provided and the arranging of a lower cylinder cover, piston rod, gland and steam valve make the use of the steam in the main engine easy, without any disturbance and difficulty of the combustion cycle, and with the addition of the minimum number of moving parts and therefore of their unavoidable frictional resistances.

The question then arises, is such a method whilst evidently economical from the point of view of construction, as economical, as is possible from the view of economy in the use if the steam?

The answer is that it is inconceivable to find any system by which the steam could be used more economically.

It is evident that the combustion piston is the hottest part of the engine, and as this is also used as the steam piston the steam will receive heat during expansion from it, and therefore pass to exhaust at a high superheat, whilst the heat it receives is given up from the hot piston which in turn keeps at a workable temperature.

Because of this fact it is possible but not desirable to expand the steam right down in a single cylinder without condensation losses.

Summing up it will be seen that the fact of using both a combustion cycle and a steam cycle to work in the same cylinder causes an inter-action between them is to the advantage of both.

A combustion cylinder of necessity has to be kept cool to allow of mechanical operation, whilst a steam cylinder is better kept hotter than the steam, to produce economical results, the Still combination of the two is therefore absolutely logical.

Up to this point only the scientific or thermal considerations have been dealt with; what are the mechanical effects and the changes in mechanical parts ne-

cessary to allow of the use of a system which can produce such results.

The one point about the Still System which renders it attractive to the author is the simplicity which can be obtained thereby.

The Mechanical Changes

The main mechanical change, namely, the fitting of a cover, gland and valve on the lower end of the cylinder has been mentioned.

There is no difficulty about this, and the arrangement is actually used in one make of two-stroke engines to allow of air starting on the lower side of the piston, after which the air swept out of the lower part of the cylinder is used to augment the scavenge supply.

There are other essential points and these are the cylinder liner, cover and piston.

Owing to the high temperature of the cooling water, say 300 deg. F., it is essential that the difference of temperature between the water and the inner wall of the liner should be small, otherwise the inner surface temperature will be such as to render lubrication difficult. There is only one method by which this temperature difference can be made small if cast iron is the material to be used in the manufacture of the liner, and that is by making its walls thin. Obviously a thin cast iron liner cannot withstand the bursting stress due to the compression and combustion pressures within the cylinder.

This, Mr. Still has overcome by making the liners with outside longitudinal ribs, on the ends of which a mild steel hoop is pushed, this hoop then takes the bursting stress and the liner is only called upon to bear its longitudinal load and heat stresses.

Longitudinal ribs at practically constant temperature throughout are in the best condition for taking the longitudinal load ,an the small temperature differences which exist between any two parts, about 50 deg. F. of necessity, point to the fact that the stresses produced in it by temperature are negligible.

This arrangement of cylinder overcomes all difficulties of heat stresses, and being maintained at a uniform temperature from end to end by the jacket, it remains truly parallel and this reduces the friction of the piston rings. as they do not have to breathe in passing from end to end of the bore.

(Incidentally this form of cylinder overcomes many difficulties of the normal Diesel Engine).

The piston, to enable it to part with its heat to the steam easily, is also ribbed on its under side and the steam at entry is projected on to these ribs and in this manner it becomes heated as much as possible, whilst at the same time the piston is maintained at a reasonable working temperature.

One of the questions which is often asked is how much steam is produced by the Still engine. This question, unfortunately, cannot be answered directly, as the amount of steam is dependent upon the quantity of heat wasted by the combustion cycle. This quantity varies with the load, with the type of engine, and the cycle upon which it operates, and in this respect the author would like to emphasize that the initial advantage of the Still System is that there is a direct gain in efficiency on its combustion side, or, in other words, less heat is wasted and therefore less heat is available for generating steam than in a normal engine operating under similar conditions. It may be stated, however, that the quantity of steam generated in a complete power plant operating on the Still System at full load is somewhere between 15 per cent. and 30 per cent. of the power generated on the combustion side.

With any type of engine, however, it will be found that as the load is reduced, the quantity of steam available also decreases, until at a very light load, there is just sufficient heat available for maintaining a constant pressure in the steam generator without any steam being used. Under such conditions, however, there is no difficulty in maintaining the pistons at a reasonable temperature, for the amount of heat liberated by the combustion process is not sufficient at such a low load to cause them to overheat.

The steam which is produced, however, is used in the engine of the maximum advantage and under conditions superior to those existing in a steam engine, as has been pointed out in a previous paragraph. The following diagram shows effect of the change-over of an average Diesel engine to operate on the Still System. The upper half of the diagram gives the heat flow of the Diesel engine pure and simple; the effect of the Still System upon it is shown by the lower half of the diagram.

It will be seen from this that whereas the Diesel can only convert 31 per cent. of the heat value of the fuel used into useful work on the crankshaft, the change-over to the Still System increases this to 40 per cent. This brings up another point about which great doubt seems to exist, as it is often suggested to the author that such an arrangement must mean complication.

The Auxiliaries

In this paper the marine installation of engines on the Still System is alone being considered, and the Author ventures to say that if a survey of those Diesel ships which are already at sea is made it will be found that the greater percentage have steam boilers also included as part of the outfit. Obviously these boilers do not use sea water, therefore fresh water has to be carried in large quantities, or alternatively evaporators must be provided and care taken that all steam used is condensed; this entails the provision of condensers. The later installations of Diesels are also making use of fresh water for cooling purposes; this entails the use of a cooler for this water and circulating pumps therefor. It will be seen therefore that a Diesel engine, besides all the auxiliaries necessary for its functioning, will have to have a water cooler, an exhaust silencer (also water cooled), air reservoirs for starting air, a boiler and all the auxiliaries conected therewith; in other words, a duplicate set of plant without the advantage of such duplicate set of plant being available for main propulsion.

Now we come to the Still System. This is given in diagrammatic form with all its auxiliaries. These auxiliaries are those to which, if I may say so, as Marine Engineers we have all been accustomed since our birth, that is in a marine sense, and we know that their care has become a matter of second nature with us and we are so well acquainted with them and they have stood the tests of time so long that they can all be put down as thoroughly reliable and simple, and it will be seen from the diagram that there is no duplication, that there are fewer auxiliaries than is the case with a Diesel engine outfit, and yet they have the added advantage that at a pinch they can be made use of for the operation of the main engine. The fact is, the Still System renders an internal combustion engine a dual system. The engineer therefore has two strings to his bow, the failure of either of which will not necessarily get him into trouble with his executive officers.

One of the worst difficulties from an operating point of view which is being experienced with internal combustion engines at sea at the present time is that due to the presence of water in the fuel oil. This matter is of great moment for the increased demand for fuel oil is not likely to cause the quality to improve, but rather to deteriorate and the presence of water in the oil has of late been the means of stopping two or three Diesel engines at sea. If such an engine has water in its fuel pipe and ceases to fire, it is necessary to re-start on air. If water is still present she will refuse to start and every attempt made at re-starting will only cause a reduction in the cylinder temperature, and this entails an increasing difficulty of starting, and it must be remembered in this respect that it is impossible to inject fuel during the starting period. There is thus no ready means of overcoming the difficulty which has arisen.

The engineer in charge of a Still System engine under such circumstances can be quite happy, for by drawing on his steam reserve and, if necessary, firing up under his boiler; he can wind his engine round under steam with his fuel injection continuing to function until water has been eliminated from the system and the engine picks up again, and he can be particularly happy because the engine will still keep up at its high temperature, steam being his old and tried friend which is at hand and which he is using instead of attempting to start with a refrigerating medium.

Looking at this matter from a purely commercial point of view, there is one thing which is quite certain and that is, that the installation of a certain shaft

horse-power of engines in a ship of the Still System engine will not be more expensive than the equivalent Diesel, as in operation, the saving of fuel will be somewhere between 10 per cent. and 20 per cent., the capitalisation of such saving spread over the number of years that a ship is in service, will be found to amount to a very large proportion of the cost of the installation, and under such circumstances it is contended that it is of greater benefit to the shipowner. It should also be a benefit to the engineer who has run it, because of its greater familiarity, and this brings the author to one other point which is of great moment with the trend of shipping at the present time.

To-day we are passing through a period of trade stagnation when freights are difficult to obtain, and therefore prices are ruling low, and everything which will tend to economy should be studied with the utmost care, whether it be economy in first cost, economy in upkeep, economy in running costs. Here again the Still System is of benefit, as not only can its fuel consumption be smaller for a given duty, but the supply of lubricating oil required will be less, and this, as many of you here present know, has been one of the great troubles of many ships fitted with internal combustion engines, and further, as the members of this Institution will appreciate, there are thousands of sea-going engineers with certificates who have been trained in steam and who know steam inside out, all its failings, all its difficulties and its idiosyncrasies, for every one there is who has been trained to a sufficient knowledge of internal combustion engines as they exist to-day for the advantageous running of these at sea, and if the number of such ships augments rapidly the difficulty with personnel will increase rather than decrease.

Were such ships engined with Diesel engines on the Still System this difficulty would almost disappear, as the trouble is usually that of auxiliaries and not main engine, and the author reiterates that such auxiliaries with the Still System are those of the steam engine and not those of the internal combustion engine, and in this respect he thinks that it will be found easier for those at sea, as they will only augment their knowledge, from the point at which they have arrived by taking in charge, instead of having to change their views and begin a new education.

In conclusion, I would like to draw your attention to the remarks of Mr. Harold E. Yarrow, C. B. E., in his presidential address before the Institution of Engineers and Shipbuilders in Scotland, delivered on the 18th October, 1921. In this he pointed out that the enormous sums spent in research both at the N. P. L. Tank at Teddington and the tanks at private yards on the subject of ships' forms had been remunerative, for the result had been that it was possible to reduce the fuel consumption by 5 per cent which made a difference between "profit and loss": if 5 per cent. of fuel consumption can make this difference in this case, surely the 10 per cent. to 20 per cent benefit in fuel consumption obtained with the Still System engine is worth having.

MARITIME NEWS FROM EVERY SOURCE

St. Catharines:—The Niagara, St. Catharines and Toronto Railway have sold the steamer "Garden City" to Captain Joseph Winfret, of Montreal who will use her as a ferry between Montreal and St. Helens Island.

Quebec:—The Marine and Fisheries Department have been busy all the month of April in placing the aids to navigation in the main channel, and these are now all in place. The river ports are getting ready for a season of brisk activity.

Sault Ste. Marie:—The first steamer to reach Detroit this season was the steamer "Conneault" with coal for the Valley Camp Coal Co. She arrived in the port on the night of April 15th and after unloading left on the morning of the 16th for the southern lakes.

Victoria:— The Dominion Government are offering for sale the steamers "Stadacona" and "Armentieres" which have been laid up for some months at Esquimault. Tenders must be in the minister's office by May 1st.

Montreal.—The first ocean vessel expected in the port of Montreal this season will be the C.S.L. Bilbster, but owing to her being bound from a U. S. port she will not be entitled to the gold headed cane which is given to the first trans-Atlantic vessel making the port.

Sault Ste. Marie.—Fears are expressed for the safety of the steamer Lampden, of the Canadian lighthouse service, which during the storm of the week of April 17th is believed to have foundered in Lake Superior, southeast of Michipcoten Island.

Montreal.—The sailing of lake boats from this port to the upper lakes started this week, twenty-one vessels having signed on crews in the last few days. Some of these vessels were at Kingston, and the crews were sent forward by rail from Montreal.

St. John.—The owners of the four-masted schooner Cumberland Queen have received word from the captain that the vessel has been lost at sea. The captain, N. C. Tower, his wife, and the crew were picked up in a small boat off Cape Hatteras by the tank steamer Baltic, and landed in Charleston, S.C.

Port Stanley.—Officials of the London and Port Stanley Railway are negotiating with steamship companies in the U.S. in the endeavor to obtain a steamship service between Port Stanley and Cleveland during the coming summer season. They are optimistic of success though nothing definite has yet transpired.

Sault Ste. Marie:—During a heavy gale that blew on the night of April 19th on Lake Superior the steamer "Yorktown" was forced ashore by the wind and ice pressure. She later released herself and proceeded to the Soo. Another steamer the "Peter Reiss" became fast in the ice and had to remain stationary for a number of hours before proceeding on her voyage.

Kingston:—After being aground near the Main Ducks for the whole of the winter, the Government steamer "Concretia" has been refloated by the Donnelly Wrecking Co. The high water prevailing when the wrecking crew arrived helped matters considerably, and she was floated just in time to escape a severe storm which blew up the night following her release.

Port Arthur:—The navigation season from Port Arthur was commenced with the departure of the grain carrier "Thomas Walters" for Buffalo, with 400,000 bushels of wheat for export to the U. K. by way of Buffalo, on April 17th. The steamer "W. D. Mathews" opened the season of the port of Goderich when she sailed for Fort William on the afternoon of April 16th.

Ottawa.—The Dominion Government have purchased the ice-breaker J. D. Hazen, which was sold to Russia at the outbreak of the war, after being built by the Canadian Vickers for the Canadian service. She is at present at Cherbourg, and the price given to the French Government, which is in possession, is said to be $400,000.

San Francisco.—There has been an increase in the wages of coastwise vessel sailors by about 40 shipowners, according to an announcement by the Shipowners' Association of the Pacific Coast. These increases are voluntary on the part of the owners, and will take the form of bonuses ranging from 5 to 10 per cent a month in addition to a $5 flat increase.

St. Catharines:—While the steamer "Lakeport" was passing through the Canal at Thorold the swing bridge of the Niagara, Toronto and St. Catharines Ry. was blown round by the force of the wind, and struck the vessel with considerable force. The afterhouse was demolished, and several pipes were sheared off. The bridge itself sustained quite a lot of damage, and one workman was slightly injured. A tug had to be used to pull the bridge back in place.

Ottawa:—The sum of $5,000 is being asked from the Dominion Government to encourage the building of racing and fishing schooners in the Maritime provinces. The member for Lunenburg, Mr. William Duff, has moved the following resolution, "That in order to encourage the ship building and fishing industry it is advisable that every possible assistance be given to the promotion and maintenance of deep sea international racing, between Canada deep sea fishing vessels and those of other nations."

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G. J. DESBARATS,
Deputy Minister of the Naval Service.

Ottawa, Ont., April 1st, 1922.

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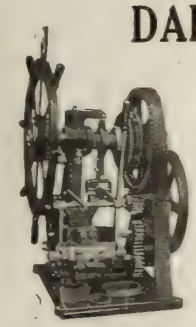

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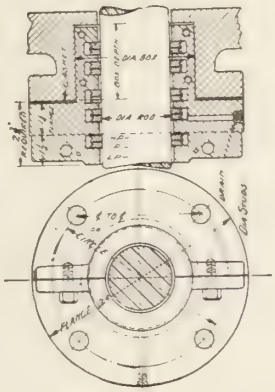

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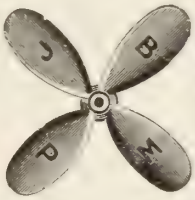

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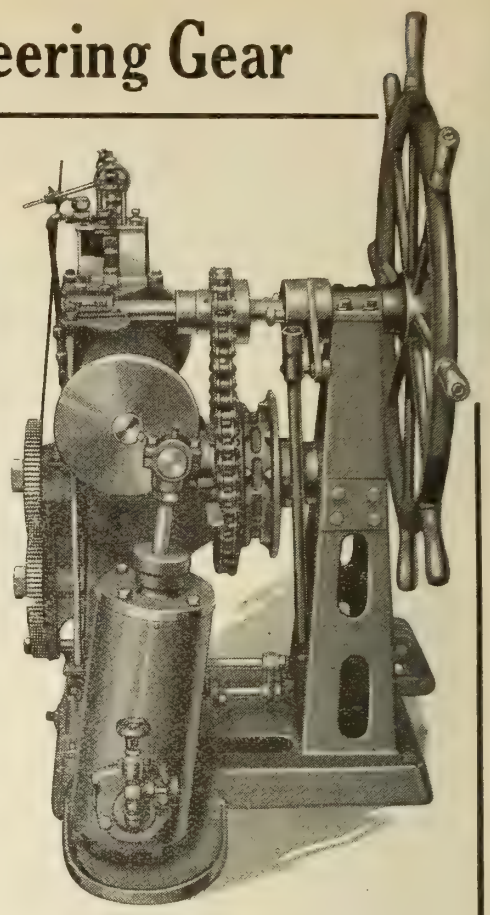

Midland Engine Works Co.
MIDLAND, ONT.

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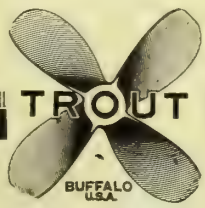

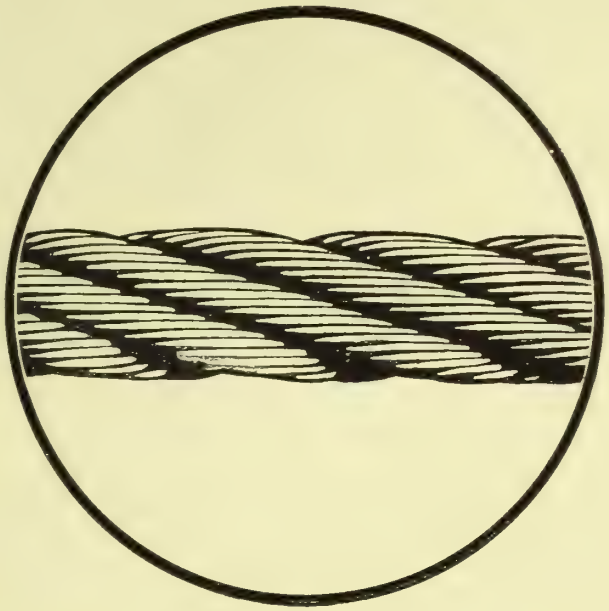

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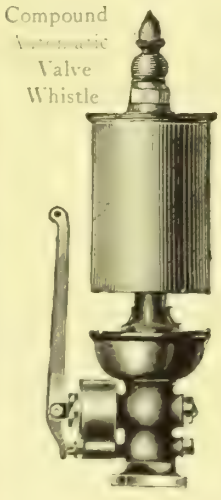

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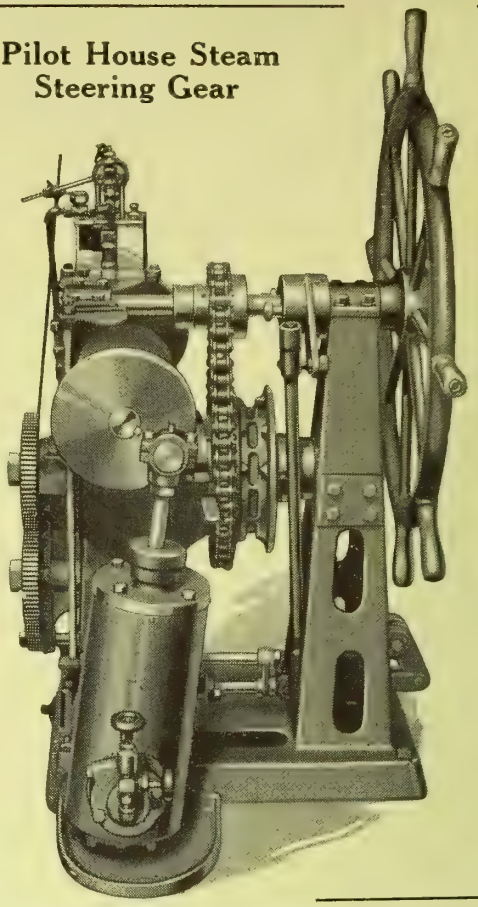

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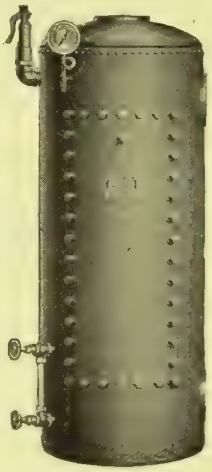
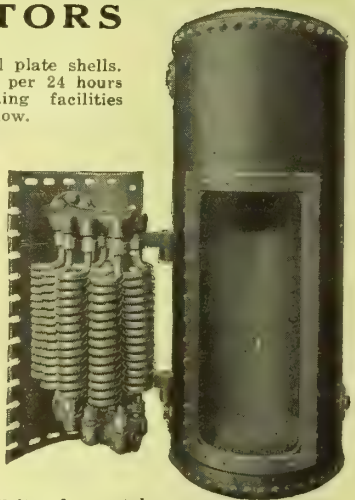


Heater



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News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

NAVIGATION on the St. Lawrence opened with a rush of ocean liners to the port of Quebec. Although the river was open from Quebec to the sea from the 1st of March, the coasting steamers of small size in operation from the 1st of April, the first big liner the C.P.R. "Empress of Scotland" did not arrive until April 30th one day later than expected. She was delayed by fog off the banks of Newfoundland and the entrance of the gulf. The non-arrival of the "Empress of Scotland" the former German liner "Kaiser Augustus" was a great disappointment to five Federal ministers, Hon. Messrs. Stewart Motherwell, Beland, Lapointe, and King of British Columbia. They were in Quebec with forty-one members of the Progressive party of Alberta, Manitoba, Saskatchewan and British Columbia, as the guests of the Canadian Pacific Railway to meet and inspect the big liner. They were received and welcomed to Quebec by the President and members of the council of the Quebec Board of Trade, and members of the Quebec Harbor Commission. The western members of the House of Commons, on their arrival Saturday morning, April 27, were escorted to the Chateau Frontenac for breakfast, and afterwards motored out to Cap Rouge to visit and inspect the Quebec Bridge. They were later taken a trip on the harbor by the Government steamer "Lady Grey" during which time luncheon was served. The steamer carried them up the river some seven miles in order to see the possibilities of the port, if docks and grain elevators were built on each side of the river in connection with the railways. The trip was extended far enough to carry them under the big bridge, and then the vessel steamed down the river as far as Indian Cove, stopping on the way back at the Government drydock. The party went ashore to inspect the two drydocks at the Davie Shipbuilding yard.

The harbor and its possibilities made a great impression on the western members, this being their first visit. They did not hesitate to express the amazement they felt at the harbor and its equipment, and wondered why the grain from the west could not be shipped entirely through Quebec and other Canadian ports instead of American.

The reason, they were informed by Brig Gen. Landry, of the Harbor Commission, was the discriminatory railway rates, and the necessity of operating the Trans-Continental Railway for the purpose for which it was built. The Westerners had seen the miles of water frontage over which the rails of the Transcontinental had been laid, the decaying wharves, and the valuable property in the vicinity of Cap Rouge all lying idle. Though the Westerners were for the most part American born, and naturalised in Canada, they observed all these things with interest, and several of them remarked that they had been gazing at a bungle, which if they had not seen, they would not have believed in existence.

They were afterwards shown over the Louise docks, and the grain elevators, at which they expressed admiration.

The same evening the visitors were the guests of the Quebec Board of Trade at a dinner held in the Garrison Club, and the following day, Sunday, much to their regret, they returned to Ottawa, without seeing the arrival or docking of the "Empress of Scotland," which arrived at 6 p.m.

The coasting shipping trade in the lower St. Lawrence has assumed a new importance since the inauguration of the Clark Steamship Co., who have recently purchased a new steamer in England to be called the "Gaspesian." She will trade down to Gaspe, and also serve the intermediate ports on the south shore. She will continue the voyage on to Prince Edward Island, calling at Charlottetown. The Clark brothers engaged in this business are the younger branch of the New York and Toronto Clarks, and they are ambitious young men with a studied knowledge of the country areas contingent to the St. Lawrence on both the north and south shore, including the Matapedia country and the Labrador Coast, as well as the Gaspe Peninsula, which await development. The possibilities of these undeveloped sections together with the value of the developed regions, encourage them in their belief that a profitabl inter-coastal trade can be maintained. The vessel they have acquired is about 1,200 tons with a speed of 12 knots, 230 feet long by 30 feet beam, and a depth of hold of 13 feet 7 inches. She has accommodation for 100 passengers, 50 cabin and 50 second class, steam heated and well adapted to the trade in which she will serve. They have in competition with them other steamers, motor schooners, and sailing schooners, usually navigated by their owners. Little has been written about the vast possibilities of these undeveloped regions of the Lower St. Lawrence, but there is no doubt as to their value in future decades. A syndicate of British and American capitalists are already in the field with exploring parties on the north shore, and their efforts have it is understood not been in vain.

The "Empress of Scotland" which made her first trip to Quebec arriving on April 30 is without exception one of the finest ships of the C.P.R. fleet. She is an oil burner, and built to the best modern requirements. She is under the command of Capt. Jas. Gillies, commodore of the C.P.R. fleet.

The vessel is beautifully decorated, and contains everything for the comfort of passengers that is available to modern marine architecture. In company with the "Empress of France" she will perform the service between Quebec, Southampton, Cherbourg, and Hamburg and is expected to become very popular with American tourists, who are learning to like the St. Lawrence route. She left Quebec on May 5th with 800 passengers. One half of the saloon passengers were prominent citizens of the U. S.

The most remarkable circumstance in connection with this year's immigration is the small number of third class passengers in comparison to previous years. This is no doubt due to Government restriction of immigration. For the most part the incoming settlers are British, intermixed with returning Canadians travelling in the third class who also have to pass through the immigration inspection. The foreign immigrants who in the past entered Canada through the port of Quebec, have fallen off to almost nil. This applies especially to Russian and Polish Jews, and Italians. The Jewish representative in connection with this class of immigration, attributes this falling off to the bettering of conditions in Continental Europe, which has stopped the exodus to America. This no doubt is correct in part, but looking further for an explanation it is plain that the severe restrictions and the money required for entrance have also an effect. There is every indication from reports from the British Isles, that many thousands of English, Scotch, and Irish farmers would come out to Canada, if the severe barriers that the Government have placed up were removed. It is stated on good authority, that Mr. Stewart the Minister of Immigration is aware of this, and is seriously considering the removal of the restrictions in so far as they apply to immigrants of British birth, and of the farmer and farm laborer class.

The outlook for the export shipping trade from the port of Quebec is not too bright, for the first portion of the 1922 season. Though shipping in general is beginning to improve in the United States, the resumption of activities in this particular regard, has not yet made its appearance in the St. Lawrence route. The slump in the export of lumber from Canada, looks like remaining until the freight rates come down, when the Canadian sellers will be able to meet the competition of European lumbermen. Canadian representatives of lumber export firms, who visited Great Britain last winter to sell Canadian lumber, returned at the beginning of April without getting any appreciable amount of business. They said they could not meet the prices quoted in the United Kingdom by sellers from European countries, on account of the high shipping rates from Canada, 100 shillings per standard. The rates from Finland, Sweden etc., were only 42 shillings per standard. Consequently they did not sell enough Canadian lumber to make two full cargoes. Since their return the ocean rate has dropped to 85 shillings. If this had occurred last fall, instead of in the last week of April, they could have taken some orders. The drop to 85 shillings is not sufficient to enable the Canadian shippers to meet the competition, and make a profit. They contend they would be agreeable to a rate of 75 shillings, but 65 shillings would be the proper rate. What they consider strange, is that the C.G.M.M., with a large number of their ships idle, cannot be induced to carry lumber for 75 shillings. The shippers claim that the C. G. M. M., built and paid for by the Canadian people, should be independent, and act in emergencies in the interest of the Canadian shipping public. In the meantime the Quebec shipping interests hope that the port of Quebec will obtain its share of the shipment of Canadian grain from the prairie provinces, as well as general cargo.

Montreal Notes

Mr. Thomas Hall, president of the Hall Engineering Co., Ltd., and managing director of the Montreal Drydock and Ship Repairing Co., Ltd., returned to Montreal the first of May after an absence of several months spent in studying shipping conditions on the Western Coast. Mr. Hall was very enthusiastic regarding the quality of the work being done by several of the shipbuilding firms of British Columbia. In his opinion the work is the equal of that done in the best of European yards.

In San Francisco Mr. Hall found 70 ships that were tied up for lack of cargoes. This represented the present condition on the Western Coast, but conditions are beginning to improve.

Regarding the present season's prospects for repair work in Montreal, Mr. Hall stated the volume of work done here would in a great measure depend on the developments of the engineer's strike in Great Britain. If the strike continued, more work would be taken care of on this side of the Atlantic. If the strike were settled, all work that it would be possible to have done in European ports would be placed there, owing to the general lower scale of wages prevailing there and the high standard of work maintained.

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Cable despatches from England the latter part of April announced the death of Captain H. L. Waite, commander of the Canadian Pacific Steamship "Melita." Captain Waite became ill shortly after the "Melita" left St. John, N. B., on April 15th. On the 20th the captain was operated on for appendicitis but did not improve, dying on the 22nd, the day before the steamer arrived at Southampton.

Captain Waite was born in October, 1872, and entered the service of the Canadian Pacific in 1904. He has sailed on the "Empress of Britain," "Metagama," "Empress of France," and "Victorian." Until recently Captain Waite commanded the "Victorian."

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Recently the Canadian Pacific steamer "Methven" was ordered from the Pacific to the Atlantic. The vessel was built especially for the cattle trade, and during the war was transferred to the Pacific service operating between Vancouver and the Orient. It is likely that the vessel will again engage in the cattle carrying trade. She is due in New York early in June. The "Mattawa," another Canadian Pacific steamer of the same size, namely 5,000 tons, has also been ordered to the Atlantic. The vessels will come to the Atlantic through the Suez Canal. From all reports traffic conditions on the Atlantic are improving. The above steamers have not as yet been assigned to any definite run. In addition to these two freighters the Canadian Pacific have the following freighters on Atlantic routes: "Bothwell," 6,800 tons between Montreal and London, "Dunbridge," 6,650 tons, between Montreal and Avonmouth, "Holbrook," 6,665 tons, the "Bolingbroke," 6,608 tons, and the "Bosworth," 6,660 tons, between Montreal, London and Rotterdam, "Mottisfont," 5,700 tons and the "Batsford," 4,800 tons, will maintain the service between Montreal and London.

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On May 5th a resolution was passed in the House of Commons at Ottawa to provide for the exemption of Canadian fishing vessels from pilotage dues. The resolution also authorizes the Government-in-Council to grant exemption from these dues, to ships of war and hospital ships of such foreign nations as may be specified by the Order-in-Council. The Minister of Marine and Fisheries, The Hon. Ernest Lapointe, explained that it had been customary to exempt fishing vessels but there was no legal authority for so doing. He further explained that the Government wished to retain the right to discriminate among foreign nations in the exemption of ships of war and hospital ships in order that the exemption might be limited to those nations which granted reciprocal privileges.

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Cable advices to the Canadian Pacific Steamships, Limited, report that on May 5th the 22,000 ton liner "Empress of Canada," sailed from Glasgow for Hong Kong on her maiden voyage. The new Empress will proceed to Hong Kong via the Suez Canal and leave that port on Vancouver on her first regular trip on June 7th. The "Empress of Canada," a twin screw gear turbine passenger liner of 22,000 tons, was built for the Pacific mail and passenger service between Vancouver, Japan, China and Manila by the Fairfield Shipbuilding and Engineering Co., Ltd., Govan, Glasgow. She is the largest steamship yet built by the Fairfield Company and will also be the largest mail and passenger steamship on the Pacific. The steamer has an overall length of 653 feet, is 77 ft. 9 in. in breadth and 53½ ft. in depth to the bridge deck, with a straight stem and a cruiser stern, three funnels and two pole masts. Special attention was given to the design of the steamer in view of the fact that she is to serve in a semi-tropical climate. Public rooms and private apartments are, therefore, large and

airy and the ventilation amply and sufficiently arranged. There is installed a telephone system with central exchange, a complete system of wireless telegraphy, submarine signalling and electric apparatus, also a gyro compass. In addition the ship is fully equipped with a swimming pool, laundry, dispensary, hospital, information bureau, barber shop and all the conveniences of a modern hotel.

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The strike of Montreal longshoremen which started on April 16th, was settled on Friday, May 5th. In the meantime such ships that came to Montreal were unloaded and loaded with non-union labor. There was one more or less serious riot in connection with shipping companies and the Shipping Federation using non-union labor. The terms of the new agreement which were signed on Saturday, May 6th, are as follows: The working hours will be from 7 a.m. until 12 a.m. and from 1 p.m. to 6 p.m. at the rate of 50 cents per hour for this day work, and from 7 p.m. until 11 p.m. and from 12 p.m. until 5 a.m. the rate of 60 cents an hour will apply for night work. Double time will be paid on Sunday. The agreement represents a cut of 10 cents an hour from the scale in force last year.

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The port warden's regulations, with regard to the storage of bulk grain in the 'tween decks on grain cargo vessels, were some months ago brought to the attention of the Corn Exchange Association of Montreal and as a result of a discussion at a meeting of that body in January last, these have been amended. It is stated that the regulation required the bagging of grain which was stowed between decks and this caused undue expense in loading grain cargoes which was discriminating against the port. This regulation will be amended at once and in future the port warden will enjoy greater measure of discretion in applying these rules.

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News came from St. John, N. B., on April 25th, stating that the steamer "Champlain" burned to the water's edge and sunk near Glenwood wharf on the St. John River. She was en route to Grand Lake from St. John when fire broke out on board and all efforts to extinguish the blaze proved useless. Part of the steamer's cargo was rescued, but the vessel itself was a total loss. She was valued at about $15,000 and was owned by the Majestic Steamship Company of St. John.

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Thirty prominent citizens of Portland and the State of Maine spent an active day in Montreal on Tuesday, May 2, in examining the port equipment for the speedy handling of ocean passengers and freight with the object of obtaining pointers to be used in connection with the pier construction program being carried on by the State of Maine Pier Commissioners at Portland. The visitors arrived in the city on the Canadian Pacific Liner "Montcalm" from Quebec where they had spent the previous day inspecting the facilities at that port. While here they were guests of the Montreal Harbor Commissioners, the Robert Reford Company and the White Star-Dominion Line. On arrival the party was formally received by Mr. M. P. Fennell, general manager of the Port. At 10 o'clock the party embarked on a special train provided by the Grand Trunk Railway and were taken on a trip of inspection of the harbor front as far as Montreal East. On return trip they stopped at the Canadian Vickers plant and inspected that firm's big dry dock and afterwards the Commissioners' new cold storage plant, No. 1 grain elevator and several of the piers. At 11.30 the delegation gathered in the Harbor Commissioner's offices and listened to an address by Mr. Fennell on Port Management. Following this they were entertained at lunch by the Harbor Commissioners on board the Steamer "Sir Hugh Allen." In the afternoon they were again the guests of the Grand Trunk Railway for a visit to the railway terminals of the city. Following this an automobile drive was taken in which the various points of interest of the city were visited. At 7.30 they were entertained at dinner at the St. James Club as guests of the White Star-Dominion Line and the Robert Reford Company.

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In spite of the Canadian embargo on cattle in England, Montreal port is now looking forward to a busy year in the export of live stock. Approximately 2,000 head of cattle were shipped from Montreal in the first two weeks of May. Local men who are interested in cattle export business claim that the volume of this traffic out of Montreal this season will be limited only by the tonnage available. The White Star Line have placed in the cattle carrying trade out of Montreal a number of cattle carriers of the type of the "Welshman" and the "Cornishman."

The operation of the Fordney Bill is continuing to divert Canadian cattle shipments overseas and, while last year was the best record in ten years, it is felt that there will be even a greater volume of cattle shipped over the local wharves this season. The Canadian Government Merchant Marine freighters are taking out a fair quota of cattle as well as some of the other shipping companies. Early in May the Canadian Government Merchant Marine freighter "Canadian Commander" took out a dock load of cattle bound for Antwerp and it is reported that most of the shipment is due to find its way to Switzerland which country bought Canadian cattle last year and is one of the few European countries which has sufficient money to buy beef on the hoof. All the cattle shipped to Switzerland are for killing although Switzerland is itself a stock raising country.

Dr. W. L. McDougald, president of the Harbor Commissioners of Montreal, who returned to the city on the first of May, has the following remarks to make: "Many well-informed men on the other side do not look for any general revival in business conditions for a year or eighteen months to come, but in spite of this all indications point to a big season ahead for Montreal harbor, in fact a bigger season than the record one of last year. I expect that the volume of grain traffic will be especially notable. According to everything I can learn from grain and shipping men we may confidently look for a bumper grain movement through this port in 1922." Dr. McDougald also referred to the fact that the provision for loading grain into tramp steamers that has been recently made in Montreal harbor has been received extremely well on the other side of the Atlantic. One point which seemed to impress the president of the Harbor Commissioners was that the cleanliness of the port of Montreal was very marked when compared with every other port which he saw during his trip.

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As an indication that the Russian routes are again opening up and that traffic is reviving in this direction the White Star-Dominion Line announced recently that they are quoting a through rate from Montreal to Petrograd travelling via Antwerp or Rotterdam. The Company states that the Russian Soviet Government is now issuing Soviet passports to Eastbound passengers under certain conditions, and it is expected shortly that existing restrictions may be lifted.

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The White Star-Dominion Line have opened up a new service between Montreal, Cherbourg, Southampton and Bremen and have placed the liners Poland and Vedic on this route. These steamers carry third class passengers only and maintain a three weeks schedule. Both the Vedic and the Poland are new ships and are reported to be fitted with all modern comforts and conveniences. The Poland made her first sailing from Montreal on May 17th and is to be followed three weeks later by the Vedic which steamer made several trips to Montreal last season.

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According to Mr. J. Ritchie Bell, manager of the Montreal Sailors' Institute, there seems to be broadcast the fact that when the ice clears from the St. Lawrence in the spring and the port of Montreal opens up for navigation, that Montreal is one of the busiest ports on the North American continent. The result is that men flock to Montreal from Boston, Philadelphia and in some cases even from New Orleans seeking berths on board trans-Atlantic steamers. This year has been no exception and with the formal opening of the Sailors' institute on the first of May there was a record number of men present. Previous to this for about three weeks Mr. Ritchie

Bell stated that he had been feeding as many as one hundred and seventy-five men who were stranded in this city awaiting berths on board the various steamers.

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From reports received by the local office of the White Star-Dominion Line concerning the speed of the largest ship in the world, the "Majestic," now at Southampton outfitting for her first voyage to New York, it appears that the ship is much faster than had been assumed and that in building her as the original "Bismark," the Germans must have been aiming at the speed laurels of the Atlantic. When the Majestic was turned over to the Allied Reparations Commission in accordance with the peace treaty and later when purchased by the White Star Line she was rated as being capable of 23 knots an hour with her quadruple turbine engines developing 64,000 shaft horse-power at 180 revolutions per minute. It now transpires, however, that at the ship's trial on her way to Southampton after her delivery to the White Star Line the engineers found that her engines developed nearly 80,000 horse-power at 180 revolutions and that although she was not pushed for speed she made 25 knots an hour very comfortably. This has led to an immediate revision of the estimates as to what the ship could do when engaged in the Atlantic service and to an official statement from Mr. P. A. S. Franklin, president of the White Star and associated lines, is attributed the statement that the giant liner will comfortably exceed 25 knots speed under ordinary conditions. Engineers familiar with the big ocean liners predict that the Majestic when driven to develop a maximum of 100,000 horse-power, of which she is now believed to be capable, will become a formidable candidate for the Atlantic record. That record is now held by the Mauretania and is thirteen years old, the time being 4 days, 10 hours, 41 minutes from Queenstown to New York. The Majestic left Southampton on her maiden voyage on May 10 and will sail from New York on May 20 and regularly thereafter.

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About the middle of May the Canadian Pacific Steamships Limited announced that the advent of the two new Pacific Empresses namely, the "Empress of Australia" and the "Empress of Canada," would result in the withdrawing from that service of the two old, well-known steamers "Empress of Japan" and the "Monteagle." The "Monteagle" arrived in Vancouver about the 20th of May from the Orient on her last trip, which trip completes nearly one hundred voyages. The "Empress of Japan" will make one more voyage sailing for the Orient on June 1st and returning to Vancouver about July 19th when she also will be withdrawn. The "Empress of Japan" has won for herself a very enviable reputation. She was built by the Naval Construction and Armaments Co., Ltd., of Barrow-on-Furness, in 1891 and is a twin screw steamship of 5,940 gross tons. For thirty years she has travelled between Vancouver and the Orient and has had the remarkable experience of never having had a mishap. When the Empress of Japan arrived in Vancouver the latter part of May she had completed her one hundred and fifty-seventh voyage. In mileage this means a distance practically of 2,500,000 miles. The "Monteagle" was built in 1889 by Palmer's of Newcastle and is a vessel of 6,200 tons.

The company has not announced just what they plan to do with these steamers.

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PORT OF ST. JOHN, N. B.

THE winter season (November 1st to May 1st) just closed has been a record one for the port of St. John.

The number of steamers and the amount of traffic which cleared was far in excess of that anticipated by steamship interests at the beginning of the season. Some of the companies report an increase over last winter season of from thirty-five to fifty per cent. in number of steamers.

The following is a list of the business transacted through the port for the year ending March 31, 1922.

Inwards from Sea.

Steam	524 vessels	964,296 tons
Sail	127 vessels	45,322 tons
Total	651 tons	1,009,618 tons

Outwards for Sea

Steam	445 vessels	787,956 tons
Sail	121 vessels	33,260 tons
Total	566 vessels	821,216 tons

Coastwise Inwards

Steam	1,429 vessels	346,343 tons
Sail	89 vessels	3,751 tons
Total	1,518 vessels	350,094 tons

Coastwise Outwards

Steam	1,468 vessels	512,402 tons
Sail	210 vessels	26,065 tons
Total	1,669 vessels	538,467 tons

The revenue derived from top wharfage, etc., on wharves owned by the city during the month of March established a record and we are glad to report that the revenue for the month of April exceeded all previous records the amount of $31,428.82 being collected. This amount is $1,397.77 in excess of revenue collected for any single month in the history of the port.

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The new oil tank erected at Courtenay Bay by Allan McAvity of this city was in operation for the first time this winter. Mr. McAvity is also erecting large oil tanks at the ports of Montreal and Quebec.

The capacity of tank is 55,000 barrels and the bunker oil is supplied the steamers by scows. The capacity of the largest scow is 3,000 barrels.

As this is only the beginning of this enterprise at this port it is anticipated that it will be necessary to make many additions to the present plant.

In the past, many steamers have been unable to make St. John a port of call on account of no oil bunkering facilities and it is now trusted that all steamers possible will take advantage of the present bunkering facilities.

During the winter two complete oil cargoes were delivered to the tank, totalling about 110,000 barrels.

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During the season, 2,896 head of cattle have been shipped through the new Government yards at West St., St. John. Out of the total six shipments during the winter only three head were not permitted to be exported and this was on account of injuries received.

The largest single shipment cleared on the "Manchester Corporation," sailed for Manchester England April 21, 1922, and totalled 711 head.

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The Maritime division of Canadian Manufactures' Association which will hold their annual meeting at St. Andrews, N. B., June 20-23, will discuss the selling of the C. G. M. M. ships under 5,000 tons and procure steamers of larger tonnage in order to capture the West Indies trade. The Maritime division intend to have the association take up the matter with the Government. These larger ships would take care of passenger service and refrigerator transportation and should also stimulate tourist traffic between Canada and the West Indies and divert Canadian from Florida and U. S. A. points to resorts in the West Indies.

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During the winter a new service was opened from St. John to Cuba and Jamaica by the C. P. Steamships Ltd. steamships "Sicilian" and "Montezuma."

The "Sicilian" will continue the service for the summer months. This steamer which arrived some three weeks ago brought a large consignment of bananas. The fruit out-turned in exceptionally good order and this was the first venture of its kind. It is rumored the C. P. R. are anticipating leaving out Cuba in the return voyage from Jamaica; this would insure best possible results.

The trade with Cuba during year 1921 was the best in the history of this port. From November 1st to April 30, 1922, some 22 steamers cleared for Havana; in the same period about 230,192 bags of potatoes were shipped from this port, together with a large quantity of general cargo. Fourteen complete potato cargoes were carried by chartered steamers cleared for Cuba in the above period. Value of potatoes shipped from Jan. 1, 1921 to Dec. 31, 1921, was $666,125; hay and fish valued at $23,378. The Cuban potato market formerly was controlled by the United States but the Maritime Provinces now control the bulk of this traffic.

On account of the building boom in New York and vicinity, large quantities of lumber are being shipped by schooners from the Maritime Provinces to the States.

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The dredge "Tornado" at Courtenay Bay is being converted into an oil burner.

The s. s "Empress" is being converted into an oil burner by Phoenix Foundry of this city and is expected to be on the St. John Digby route about the last of this month. In the meantime the twin screw, oil burner s.s. "Prince Arthur" is taking the place of the "Empress."

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On the invitation of Senator W. H. Thorne, a number of senators visited the city on May 5 and during their stay were escorted around the water front on the tug "Murray Stewart." The senators expressed satisfaction at the facilities of the Harbour, they also agreed to the necessity of the Negro Point breakwater being extended to Partridge Island. This extension has often been promised by the government but has never been carried out.

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The two-masted schooner "Grand Desert" owned in the Magdalene Islands bound from Charlottetown, P. E. I., to Port Elgin N. B. with a cargo of herring is a total wreck at Bayfield on the north side of P. E. I.

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Upon removing the hatches of the R. M. S. P. liner "Caraquet" which arrived May 9, fire was noticed in one of the holds, among the sugar. A quantity was unloaded before the water was turned on. The fire is thought to have been caused by spontaneous combustion. Considerable damage was caused by the water but this, however, was not very serious.

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The Steamer "Glencova" which left San Domingo early in April with 2,400 tons of raw sugar for the local refineries lost her propeller blades while in the vicinity of the West Indies. She was picked up by the s.s. "Huron" and towed into Charlestown where repairs were made. She afterwards continued her trip but when in the vicinity of Grand Manan the "Glencova" ran out of oil fuel. She then anchored and the tug "Murray Stewart" went to her assistance and towed her to port. She arrived at St. John, May 2, and discharged cargo. At present she is in Market Slip undergoing repairs.

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The two C. P. R. elevators at West St. John (total capacity 1,750,000 bushels) loaded 3,004,000 bushels for the last past season Nov. 1 to April 30, 1922. This is an increase of 1,961,391 bushels over a like period for the previous year.

The C. N. R. elevator at East St. John (total capacity 500,000 bushels) loaded 3,400,000 bushels for the last

Halifax, May 10—The German Steamer "Elsie Hugo Stinnes" from New Orleans to Hamburg put into port on fire.

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Preparations are now being made for the pouring of concrete at the Dry Docks. Already some of the concrete work has been started on the breakwater.

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Dredging operations are now being carried on by the St. John Dry Dock and Ship Building Co. The two large dredges "Tornado" and "Leaconsfield" are working on the site.

The C. G. M. M. Steamer "Canadian Conqueror" which sailed the latter part of April loaded 394 cases of automobiles for the United Kingdom. This is the largest shipment of autos during the winter.

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The Canadian Pacific Steamships, Ltd., liner "Sicilian" left on the 17th for Havana via Boston. Among the passengers were 348 Chinese who are en route from Hong Kong to Havana and points in the West Indies. This steamer was held up for some three weeks awaiting the arrival of these Chinese.

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The International Division of the Eastern Steamships Lines, Inc., resumed its service from Boston to this port on Monday, May 22, when the steamer "Governor Dingley" came on the route. The service may be permanent now, as the company has a steamer in view for the winter service, which would handle large freight consignments and about twenty-five passengers. This will depend upon the prospects for business. The present service will be bi-weekly, with sailings from St. John on Wednesday and Saturday, the latter trip to be direct to Boston.

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Canadian Government Merchant Marine report 31 full outward cargoes during the last winter season. All of these were destined for the United Kingdom The number of outward clearances for this line was an exceptional increase over last year.

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It is pleasing to report that there was very little pilfering at the port during the last season. The losses were kept down to a minimum on account of the exceptional number of watchmen employed and the elimination of night work.

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Vice-Consul Herman Ryers acting consul at the Port of St. John was relieved by Consul Stable. Mr. Ryers left for Havana on the "Sicilian" which sailed the 17th.

Halifax Notes

THE WINTER season which came to a close with the opening of navigation on the St. Lawrence was one of the quietest the port of Halifax has had in recent years. Compared with the busy times during war days the past season was a dead one. So few were the ocean going steamers to call here that at no time were all the berths occupied.

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Halifax had only its regular winter services this year and even these were not up to normal. This was due to the world-wide trade demoralization. The passenger liners calling here were few and the number of freighters was the smallest for many seasons. The principal export was the movement of the Nova Scotia apple crop to the markets of the United Kingdom. Practically no grain was handled and very little lumber.

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The passenger liners calling here during the winter season were those of the Cunard, Anchor-Donaldson, White Star-Dominion and the Baltic-American. These ships did not make as many calls as in former years and the passenger traffic was light. They occasionally brought mails and cargo. None of these ships were turned around at Halifax, they either going to Portland, Me., or New York.

In the freight line the ships of the Canadian Government Merchant Marine were one of the principal assets. Although quite a large number of these ships were laid up here during the winter there were a number of sailings. They were practically the only ships to use the South End Terminals. The Furness Line had many sailings while the apple season was on but once the crop had been exported their local business fell off considerably. At present their only service out of this port is the regular all-year one between Liverpool, St. John's, Halifax and Boston. The ships of the Royal Mail Steam Packet Company, which use Halifax all the year carried large cargoes and provided considerable employment for stevedores. Pickford and Black also maintained two steamers on their service to Santiago and Jamaica.

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In the coastal trade the Red Cross Line maintained a regular service between St. John's, Nfld., Halifax and New York, also the Tri-National Steamship Co., which has its American terminus at Boston. With the ships of Farquhar and Company these lines made frequent sailings to Newfoundland.

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Towards the end of the winter season the export of refined sugar picked up considerably and a number of large cargoes were loaded for trans-Atlantic movement of raw sugar inwards from the West Indies.

The schooner B. R. Tower, built at Diligent River, N. S., in 1920, and one of the finest of Parrsboro's fleet of three-masters, was lost near Turys Island this month while bound north. She was owned by J. Newton Pugsley and others who suffered a heavy loss as she was only partially insured.

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Two of the most modern ships of the United States coast guard service are now on ice patrol duty on the Grand Banks. They are the Tampa and Madoc, both put into commission this year and electrically operated. They come to Halifax regularly for supplies.

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Except for an occasional shipment to the United Kingdom practically the only lumber being shipped from Halifax is consigned to American ports and the West Indies. During the past month this has showed a great improvement and quite a large fleet of schooners have taken cargoes here for New York and vicinity. The markets of the United Kingdom are still unavailable but it is hoped that this year will bring forth a demand for Nova Scotia timber from across the Atlantic.

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Although the fleet of the Canadian Government Merchant Marine, which visited Halifax during the winter months, are now engaged on services from Montreal, there is at present a fleet of eight ships laid up at Halifax. This month the fleet was moved from the North West Arm, where they spent the winter, to the Eastern Passage. Unless there is a marked improvement in shipping there are little prospects of any of these ships being put in commission this year.

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Should the Canadian parliament decide to lay up the ships that comprise the Canadian navy it will be a bad blow for Halifax. Although they have made cruises to the Pacific and south, as well as up the Lawrence, since being accepted by Canada, the Aurora, Patriot and Patrician, have had their base here. Haligonians will greatly miss the personnel of these ships.

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H. M. C. S. Grilse, one of the speediest and finest craft that patrolled the Canadian coast during the war, has been purchased by S. R. Guggenheim, of New York, America's copper king, who will convert her into a private yacht. The ship was laid up here since the cessation of hostilities and is being commissioned for the run to New York, where she will be thoroughly re-conditioned. Built at Glasgow in 1912 the Grilse has had a most interesting career. She was at one time owned by J. K. L. Ross and was then known as the Winchester. At the outbreak of war she was handed over to the government by him and armed for patrol duty. She is an oil burner with an indicated horsepower of 6,000.

The small two-masted schooner, Dorothy, has been purchased by John F. McIsaac of Parrsboro from Captain William Hill, of Walton, N. S.

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The Norwegian steamer Belverdon has been purchased by the Tri-National Steamship Corporation and has replaced the steamer Bornholm on the Boston-Halifax-St. John's service. She will be transferred to British Register.

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Another of the fleet of naval vessels sold is the former H. M. C. S. Shearwater, which has been purchased by the Western Shipping Company, of Vancouver. She will shortly be handed over.

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The tern schooner Esther Adelaide has been purchased by J. Newton Pugsley and T. K. Bentley, or Parrsboro, who will operate her in the coastal trade between Canadian and American ports. The tern schooner Vincent A. White has been sold to Baltimore parties.

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Furness Withy and Company's New York-Halifax-Quebec service, which is known as the Saguenay Cruise, will be maintained this summer by the steamer Fort Hamilton, formerly on the New York-Bermuda route. This pre-war summer cruise was revived last year by the steamer Fort St. George.

* * * *

The two government mackerel scouts, the Arras and Arleux, have again taken up their duties and have reported some mackerel approaching the Nova Scotia coast. The ships started out early this month and proceeded to south of Cape Sable to maintain a lookout for the schools.

* * * *

This season there is what may be called an advance in the mackerel fishery. The trawler Lemberg, which was fresh fishing out of Halifax all winter, is now mackerel seining. She is equipped with a large purse seine boat. This adventure is being watched with interest. The Lemberg is equipped with wireless.

* * * *

All of the Lunenburg fleet are now out on their second spring trip and according to reports are doing well. Some of the vessels hailed for a good size fare on their first trip. The Bluenose returned with 700 quintals and it is expected that she will near a thousand quintals before she returns from her second trip. She was at Canso recently for bait and then had three hundred quintals aboard, the reward of a week's fishing.

* * * *

With the Lenten season over the fresh fish demand has fallen off but still there is a good demand. The majority of the Nova Scotia fleet of fresh fishermen have either turned their attention to salt fishing or are after mackerel. Only one trawler is now fresh fishing. She is the Venosta, Captain G. Myhre, considered the highliner of the fleet. She is landing about 200,000 pounds weekly, which is about sufficient for the demand.

It is expected that the Silvia, purchased by the Red Cross Line, will be ready to go on their New York-Halifax-St. John's service next month. Labor trouble in the United Kingdom has delayed the ship, which is being re-conditioned on the Clyde.

NEW STEAMSHIP LINE

Late in April announcement was made of the organization of "Canada Industries Limited," a new shipping company to operate in connection with the Canada Cement Co., as distributors of Canadian products in the West Indies, Mexican Gulf and Central American ports. Major Henry C. Brubaker, president of the new company, stated that arrangements had already been completed to start a steamship service this season, with four vessels of six to seven thousand tons each. The service will be from Montreal in the summer months and the steamers will sail from St. John and Halifax in the winter. The vessels will carry cement and general cargo bringing back such cargos as are available, chiefly coffee, tropical fruit, woods, etc. giving a direct service between Canada and these West Indian ports which has been long demanded and will obviate the present necessity of sending such shipments either way via American ports. "Canada Industries Limited" are opening up offices in the new Canada Cement Building, on Phillips Square in Montreal and are preparing to immediately put their services in operation.

APPOINTMENTS TO C. G. M. M.

We are advised that Mr. E. Sutherland has been appointed to the steamer "Canadian Challenger" as Chief Engineer.

Mr. W. Harrison has been appointed in a similar capacity to the S. S. "Canadian Explorer."

These appointments have been made since April 18th.

CANADIAN PACIFIC RAILWAY

Great Lakes S. S. Service

S. S. "Assiniboia—J. McConnel, captain; A. A. Cameron, engineer.

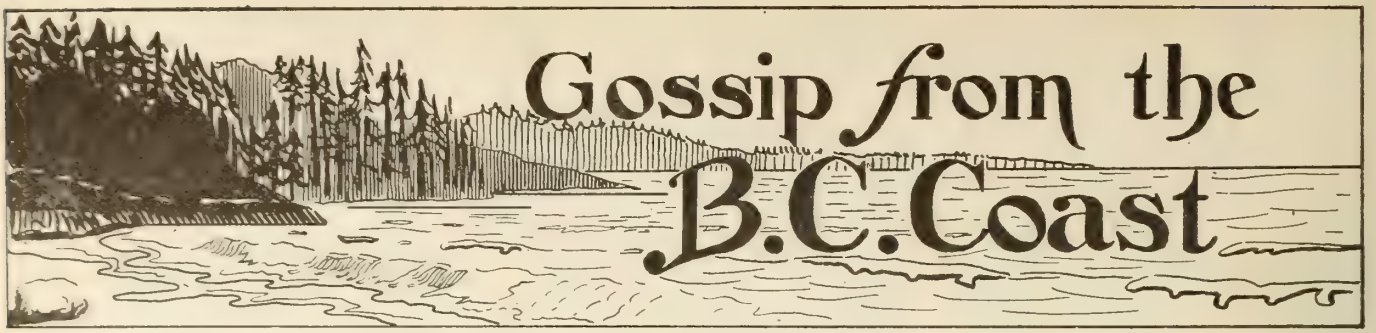
S.S. "Keewatin"—M. McPhee, captain; C. Butterworth, engineer.

S.S. "Manitoba—F. J. Davis, captain; G. D. Adam, engineer.

S.S. "Athabasca"—M. McKay, captain; G. S. Rae, engineer.

S.S. "Alberta"—J. McIntyre, captain; W. S. Struthers, engineer.

Brockville:—The fire on board the "Conestoga" which occurred when the vessel was passing through the Cardinal Canal resulted in her being a total loss. She was sunk in shallow water to extinguish the flames. The underwriters have abandoned the vessel, and will sell her cargo amounting to about 30,000 bushels for what it will bring. The loss on vessel and cargo will amount to about $200,000.



THE Canadian Government has revoked its order suspending construction of the Esquimalt drydock and work will be resumed at once, according to a message received from Premier Mackenzie King by Hon. John Hart, Provincial Minister of Finance, who headed a Victoria delegation which went to the Federal capital recently to press for resumption of the dock building operations.

The advanced stage in construction reached and the heavy expenditure that the Government would have to meet even if the job were temporarily abandoned were the two principal factors entering into the Government's decision, as the sole reason for ordering cessation of construction was said to be financial, no appropriation for carrying on the work having been made in this year's Federal estimates.

The Government appears to have definitely refused to proceed with the subsidized drydock that was to have been built in Vancouver by J. Coughlan and Son. In spite of vigorous action by Vancouver's business organizations, it is said to be the attitude of the administration that the Government cannot afford to assist in the construction of more than one drydock on the Pacific Coast at the present time.

The Esquimalt drydock, which is being built by the firm of Peter Lyall and Sons, will rank among the very largest in the world.

Since no British or Canadian line has considered it worth while to institute a water route service between the Canadian Atlantic and Pacific ports, it is now to be undertaken by an American company with ships of British registry. It is expected that the new service will materially facilitate the shipment of lumber between British Columbia and Eastern Canadian points. It is stated that Eastern Canadian importers of Pacific Coast lumber must make their purchases through Americans on account of the lack of direct steamship connections controlled by British or Canadian interests and this results in buying almost entirely from American mills. The Porter Transportation Company of New York is arranging for the new service and will operate the steamship Dicto on a regular intercoastal run, adding other vessels as requirements develop. F. J. Hayward will represent the company on the Pacific coast, with offices in Vancouver.

It is proposed to change the name of the steamer President, of the Admiral Line, to Dorothy Alexander, in honor of a daughter of President H. F. Alexander, of the Pacific Steamship Company, operators of the Admiral fleet. Other Admiral vessels are also to be re-named.

A new ferry service has been inaugurated between Sidney, Vancouver Island and Anacortes, Wash. The service is maintained by the vessels Harvester King and Gleaner and is expected to encourage motor tourist traffic between the state of Washington and the island. Opening of the new route was celebrated at a banquet in Victoria at which prominent British Columbians and Washington citizens were present.

John Milward, representative of the Pacific Cable Board, passed through Victoria recently on his way to attend a directors' meeting in London after making an investigation of the proposals for duplicating the Pacific cable. While in the south seas he visited Fanning Island and other important links in the cable line. Mr. Milward estimates that it will cost about $10,000,000 to carry out the project and that two years will be required to complete it.

Capt. S. W. Bucknam, veteran Victoria navigator, died a few days ago in Portland, Ore. He was 74 years old and had followed the sea for sixty years. After serving on Atlantic steamships for some years he brought the seafing schooner Ariel from St. Johns, N. B., to Victoria by way of the Straits of Magellan. He commanded the famous steamer Beaver for some time and during the war commanded vessels plying between the James Island explosive works and Victoria.

The Canadian Pacific Steamships liner Empress of India, originally intended for the trans-Pacific service, will be retained on the Atlantic route. Formerly the German steamship Prinz Friederich Wilhelm, she has been engaged during the past winter in the run between New York and Southampton. She is due to leave Liverpool June 23, for Quebec and will maintain regular sailings between those ports during the summer. She has a tonnage of 17,500 and in that respect holds second place only to the Empress of Scotland and Empress of France in the Canadian Pacific Atlantic fleet.

William Allen, for many years head of the shipping department of Rithets Consolidated, Victoria, has been appointed Victoria agent of the Pacific Steamship Company and Admiral Line.

Capt. Harry Trim, pioneer of the British Columbia and Pacific coastwise trade, died recently on his farm near Vancouver. He commenced his career as a navigator on the Great Lakes, but came to British Columbia in the 'Sixties, engaged in whaling and trading, and was for some years pilot to the Indian Commission.

The Empress of Canada, latest addition to the Canadian Pacific Steamships fleet on the Pacific, left Falmouth, England, on May 5 after completing most satisfactory speed and sea trials. She will steam to Hongkong by way of the Suez Canal and then head for Victoria and Vancouver to enter the regular service between British Columbia ports and the Far East. She is scheduled to arrive at Hongkong on June 1. The Empress of Canada was built at the Fairfield yards on the Clyde and she will be the largest and fastest ship on this ocean, being a vessel of 22,000 tons with a speed of 25 knots. She is expected to make the run between Yokohoma and Victoria in about eight days.

Members of the International Longshoremen's Union in British Columbia have decided against a strike. The stevedoring companies will continue to operate on the open shop principle, as formerly, and under the new schedule they will have the right to name their own checkers. The question of foremen is not mentioned in the agreement, although the men asked that the appointment of foremen be left to the unions. The agreement in Vancouver and Victoria is practically the same as the one effective in Seattle. About three weeks ago the Shipping Federation gave an ultimatum that a new schedule, drawn up on the same basis as the one in force in Seattle, would be put into effect in British Columbia. The dock workers protested and threatened to strike, but by a majority of 360 the men decided to accept the agreement.

Capt. M. D. Harbord has resigned as president of the Victoria Shipowners (B. C.) Limited, and has been replaced by David Leeming, who was formerly secretary-treasurer of the company.

Capt. Harbord recently returned from Ottawa, where he made an effort to obtain further assistance from the Federal government in financing the company. Two years ago the Victoria Shipowners company was organized to build and operate wooden barquentines out of Victoria in the trans-Pacific lumber trade. The project was financed by government loans amounting to about 70 per cent. of the total capital and by sales of stock to the public. The first vessel built, the S. F. Tolmie, cost considerably more than the estimates and work was suspended on the building programme, which was to comprise four ships. The Government withdrew its support temporarily and ever since the company has been endeavoring to straighten out its finances. It is considered doubtful whether the government will extend support to the company now, as wooden shipbuilding is regarded as unprofitable at present, and the government which entered into the agreement with the company is no longer in power.

Records of marine casualties off the British Columbia coast from January 1 to date disclose few important losses. A list of the accidents suffered follows:

Steamer Cheam on fire at Wallace dock. Damage $3,500.

Steamer Chilco on fire at Union Bay. Injuries $2,000.

S. S. Canadian Observer stranded in Discovery Passage. Repairs $2,500.

Car ferry Canora struck log and bent both propellers. Damage about $4,500.

Auxiliary schooner Saucy Lass stranded at Ensenada, Mexico. Salvaged and now undergoing inspection at San Diego.

Steamer Prince John grounded at Lockeport, Q. C. I., and suffered damage estimated at $5,500.

S. S. Canadian Traveller had a fire in 'tween decks bunkers and had damage of $700.

S. S. Canadian Winner, stranding and stress of weather, $8,000. The weather injuries were usual wear and tear of 1921 voyages.

Steamer Prince John, while leaving Cassidy, V. I., backed on to bank and damaged rudder. Total claim was in neighborhood of $4,800.

Steamer Princess Royal collided with and sank tugboat Clinton. The latter was valued at $30,000. She was a total loss. The Royal suffered practically no damage.

S. S. Admiral Farragut broke from Wallace ways and commenced to fill. She was beached. Inspection in drydock did not disclose any injury from the accident, and the owners accepted her without any claims.

Steamer Princess Mary collided with gas freighter Wakena. Mary lost anchor and chain, while Wakena suffered broken deck beams, frames and planks. The injuries to the latter vessel were in the neighborhood of $4,500.

S. S. Canadian Prospector, when coming from drydock, was thrown against corner of Government pier at Vancouver by sudden squall. The shell was slightly indented at the waterline, but the ship lost no strength and continued loading after loosened rivets had been tightened.

Tug Des Brisay swamped and sunk off Trial Island with loss of one member of crew. Vessel salvaged and repaired, damage not being very extensive.

In an effort to encourage travel to the Queen Charlotte Islands, the Canadian National Railways will operate a regular service between Vancouver and the islands this spring. The steamship Prince John has been commissioned for this service. She will call at Prince Rupert and other northern British Columbia cities during the return passage. According to Capt. C. H. Nicholson, manager of the C. N. R. fleet, the company will operate a twice-weekly service between Vancouver, Victoria, Seattle and Prince Rupert this summer, employing the steamers Prince George and Prince Rupert.

With the advent to the Pacific route of the crack new liner Empress of Canada, which is now on her way to Hong Kong on the first lap of the voyage from Falmouth, and the Empress of Australia, due here in July, the Canadian Pacific Steamships, Ltd., is considering the withdrawal of the older liners Empress of Japan and Monteagle from the trans-Pacific service. The Monteagle will be laid up at Vancouver shortly. She is a good freight carrier and may be transferred to another route unless the company sells her. The Empress of Japan was built about thirty years ago at Barrow-in-Furness and came to the Pacific with her sister ships the Empress of China and Empress of India. The China was wrecked some years ago and the India was sold during the war to an Indian prince for use as a hospital ship, being re-christened Loyalty. The Empress of Japan did good service in the Far East during the war hunting for enemy raiders. She has been on the market for some time and not long ago an effort was made to sell her to the Pacific Steamship Company for the California-British Columbia route. The deal was blocked by regulations of the United States Shipping Board preventing the purchase by Americans of foreign vessels.

George Turnbull, of Birkenhead, senior naval architect of the Holt Steamship Company (Blue Funnel Line), passed through here recently on his way to the Orient on the Blue Funnel steamship Ixion. He is making a tour of inspection of drydock and ship repairing facilities at Pacific ports. Mr. Turnbull says that his company is building a number of new steamships for the China trade. Six of the steamers will have a tonnage of 10,000 and two of 14,000, the latter two with accommodation for 100 passengers. He says that his company is having a 9,500 ton ship built in China at present, and he claims that building costs there are now about the same as on the Clyde and Tyne.

The Canadian Steamships, Ltd., has declined to become a party to the freight agreement reached at a recent trans-Pacific conference held in Portland, Ore. The company demands "a regular and recognized" conference, thus indicating that it will continue to "run wild" and give no heed to the rates fixed by several companies which agreed to abide by the Portland decision. Although the conference rate on lumber was placed at $12.50 a thousand many shipments have lately been made out of British Columbia ports for the Orient at less than $10 a thousand and there have been a few instances where the charge was as low as $8. The general impression is that a new rate conference will be held in the near future. The appearance of tramp steamers on this coast after a long absence has been an important factor in persuading the regular carrying companies that a definite schedule should be adopted in order to put an end to cut-throat competition. The rate on copper, lead and spelter fixed at Portland was $5.50; $5 for flour and wheat; $12.50 for lumber; $12 measurement for canned salmon and 35 cents per cwt. for raw cotton. It is understood that Chairman Lasker, of the Shipping Board holds substantially the same view as the Canadian Pacific and that he will shortly take the initiative in bringing the companies together again.

FORT WILLIAM NOTES

The steamship Martian cleared last week for the east with grain after spending a week in drydock where she was fitted with a new rudder and shoe.

Considerable activity still exists along the water front of the two cities. Grain shipments by boat continue large and large quantities of package freight are being received from eastern ports.

Three ships carried the first cargoes of pulpwood from the head of the lakes last week. Two were bound for Muskegon, and one for Erie, Pa.

The keel of the new freighter Mattewson, which is being built by the Port Arthur Shipbuilding Co., has been laid and night and day shifts are engaged upon her construction.

Extensive repairs are being completed to the Canadian Pacific railway wharf adjoining the railway steel dock. The dock is being lowered to the level of the city wharf, immediately up river.

Several cargoes of pig iron have been received and two cargoes of binder twine since the opening of navigation. Most package freighters are arriving loaded but owing to the continuation of the coal strike in the Pennsylvania field bulk freighters are arriving light for grain. Only one cargo of coal has arrived here this year. It was loaded in a chartered bottom before the strike.

LLOYD'S REGISTER SHIPBUILDING RETURNS

For the Quarter ended December, 1921

IN LLOYD'S Register shipbuilding returns for the quarter ended, March 31, 1922, merchant tonnage returned as under construction in the United Kingdom at the end of March amounts to 2,235,998 tons. This represents a reduction of about 404,000 tons as compared with the total at the end of the previous quarter; but under the present conditions even these reduced figures cannot be regarded as a true index of the activity of the shipbuilding industry in the near future.

The total includes a considerable amount of tonnage (617,000 tons) on which work has been suspended for some time, apart from any delay arising from the present dispute in the shipbuilding and engineering industries. Deducting this amount in order to enable a comparison to be made with figures for normal times, the tonnage actually under construction in the United Kingdom now amounts to 1,619,000 tons. The average tonnage under construction during the twelve months immediately preceding the war was 1,800,000 tons, i.e., 271,000 more than the present figures. As compared with the figure for the quarter ended Dec. 31, 1921, there has been a considerable reduction (viz., 133,000 tons) in the tonnage launched in the United Kingdom during the past quarter. Although there was a slight increase recorded in the tonnage commenced during the quarter ended Dec. 31, 1921, this progress has not been maintained, and the figures for the quarter under review are practically the same as those for the quarter ended Sept. 30, 1921, viz., 51,000 tons.

The total merchant tonnage building abroad is 1,443,624 tons, but this includes about 325,000 tons upon which work has been suspended, leaving about 1,118,000 tons actually under construction. The country where the largest amount of work is suspended is Italy, such tonnage amounting to more than half of the total tonnage included in the tables as under construction in that country. It will be seen that the tonnage building abroad is about 373,000 tons lower than the total building at the end of December, 1921. The decrease affects most countries, but especially United States of America, in which country the tonnage now under construction is only 3¼ per cent. of the total building there in March, 1919. The figures for the leading countries abroad are: Italy, 311,888 tons; France, 286,255 tons; Holland, 258,240 tons; United States 136,266 tons; and Japan 117,312 tons.

A new table is inserted in the returns showing the number and tonnage of vessels launched in the world during the quarter under review. It will be seen that the total figures amount to 523,246 tons, of which 334,352 tons were launched in the United Kingdom and 188,894 tons abroad. The tonnage commenced during the same period amounted to 118,228 tons, of which 67,220 tons were commenced abroad.

The returns show that there are at the present time 95 steamers and motor-vessels, each of over 1,000 tons, with a total tonnage of 615,390 tons, under construction in the world for the carriage of oil in bulk. Of the total, 64 of 416,654 tons are under construction in the United Kingdom. The tonnage of vessels now building which are to be fitted with internal combustion engines amounts to 293,523 tons. Of the total tonnage given as being under construction in the world—which total excludes vessels the construction of which has not actually been commenced and also all vessels of less than 100 tons—2,396,073 tons are under the inspection of the Society's Surveyors, with a view to Classification in Lloyd's

MERCHANT VESSELS UNDER CONSTRUCTION

The Returns compiled by Lloyd's Register of Shipping, which takes into account only vessels of 100 tons gross and upwards the construction of which has actually been commenced show that there were 437 merchant vessels of 2,235,998 tons gross under construction in the United Kingdom at the close of the quarter ended March 31, 1922. The particulars of the vessels in question are as follows, similar details being given for the preceding quarter for the purpose of comparison:

Description	Mar. 31, 1922. No.	GrossTns	Dec. 31, 1921 No.	GrossTns
Steam				
Steel	394	2,097,595	469	2,448,371
Ferro-Concrete	...	.....	...	.....
Wood & Composite	3	1,912	3	1,912
Total	397	2,099,507	472	2,450,283
Motor				
Steel	28	133,786	36	188,191
Ferro-Concrete	...	.....	...	.....
Wood & Composite	1	205	1	205
Total	29	133,991	37	188,396
Sail				
Steel	11	2,500	6	1,640
Ferro-Concrete	..	.....	...	.....
Wood & Composite	..	.....	...	.....
Total	11	2,500	6	1,640
Total steam, motor and sail	437	2,235,998	515	2,640,319

The tonnage now under construction in the United Kingdom is about 404,000 tons less than that which was in hand at the end of last quarter, and about 1,563,000 tons less than the tonnage building 12 months ago.

These figures, however, do not represent the work actually in progress. The total now returned as under construction includes 617,000 tons on which work has been suspended, quite apart from the present dispute in the engineering and shipbuilding industries, the work actually in hand being thus reduced to 1,619,000 tons.

Of the vessels being built in the United Kingdom at the end of March, 351 of 1,757,512 tons were under the inspection of the Surveyors of Lloyd's Register with a view to classification of this Society.

MERCHANT VESSELS UNDER CONSTRUCTION IN THE WORLD

Where Building	No.	Gross Tons
United Kingdom	† 397	2,099,507
	‡ 29	133,991
	§ 11	2,500
*Other Countries	† 370	1,258,200
	‡ 85	159,532
	§ 63	25,892
Total for the World	† 767	3,357,707
	‡ 114	293,523
	§ 74	28,392

* Excluding Germany, figures for which country are not yet available.

† Steam ‡ Motor § Sail

The tonnage being built in the world at the end of March under the inspection of the Surveyors of Lloyd's Register, excluding vessels the construction of which has not actually been commenced, and all vessels of less than 100 tons, amounts to 2,396,073 tons.

WORK IN HAND IN PRINCIPAL DISTRICTS

The following table gives the total figures for vessels now under construction in the principal shipbuilding districts of this country, as compared with those for the previous quarter. Each district of course, includes places in the neighborhood of the port after which it is named.

District		Mar. 31, 1922. No.	GrossTns.	Dec. 31, 1921. No.	GrossTns.
Aberdeen	*	4	4,495	6	7,795
	†	..	.....	..	.....
	Total..	4	4,495	6	7,795
Barrow, Maryport and Workington	*	5	48,870	7	64,166
	†	1	6,998	2	13,986
	Total..	6	55,868	9	78,152
Belfast	*	29	305,610	31	321,485
	†	..	.....	..	.....
	‡	..	.....	..	.....
	Total..	29	305,610	31	321,485
Bristol	*	4	2,000	5	7,084
	†	3	7,800	3	6,500
	Total..	7	9,800	8	13,584
Clyde—					
Glasgow	*	91	534,852	107	644,724
	†	11	67,350	17	109,185
	‡	1	500	3	990
	Total..	103	602,702	127	754,899
Greenock	*	25	161,656	33	180,515
	†	3	24,300	3	24,300
	‡	..	.....	..	.....
	Total..	28	185,956	36	204,815
Dublin	*	1	880	3	3,890
Dundee	*	13	48,650	17	57,300
	†	1	7,700	1	7,700
	Total..	14	56,350	18	65,000
Hartlepool	*	12	56,680	15	67,405
Hull	*	13	34,367	13	49,781
	†	2	357	2	357
	Total..	15	34,724	15	50,144

Leith	*	5	18,470	5	21,870
	†	..	.....	..	.....
	Total..	5	18,470	5	21,870
Liverpool	*	22	89,950	26	92,200
	†	..	.....	1	120
	Total..	22	89,950	27	92,320
Londonderry	*	2	6,700	2	12,000
Middlesbro' Stockton and Whitby	*	17	91,707	24	126,075
	†	2	8,000	2	8,000
	‡	1	280	..	.....
	Total..	20	99,987	26	134,075
Newcastle	*	69	432,305	81	510,927
	†	2	5,849	2	5,849
	‡	..	.....	..	.....
	Total..	71	438,154	83	516,776
Newport, Mon.	*	5	10,046	5	13,489
	‡	..	.....	..	.....
	Total..	5	10,046	6	13,489
Southampton	*	18	43,917	20	47,929
	†	2	759	2	759
	‡	1	600	1	250
	Total..	21	45,276	23	48,938
Sunderland	*	32	176,287	39	193,305
	†	1	5,170	2	10,340
	Total..	33	181,457	41	203,645

* Steam † Motor ‡ Sail

The three tables which follow give further details of the work in United Kingdom yards; the fourth presents statistics of work abroad. It is of interest to note that at the end of March there were under construction abroad 64 steamers and motor vessels of 1000 tons and above with a total tonnage of 196,636 intended to carry oil in bulk. Of these, seven, of 67,976 tons, were building in the United States; seven, of 41,800 tons, in Italy and six, of 40,460 tons in France.

* * * *

VESSELS UNDER CONSTRUCTION FOR ABROAD

Country for which Intended.	No.	GrossTons.
United Kingdom	296	1,661,182
Argentine	4	4,850
Brazil	1	500
British Dominions	18	42,021
Belgium	4	11,360
Chili	2	14,000
Denmark	1	4,850
France	20	117,786
Greece	3	12,720
Holland	13	143,707
Italy	1	18,017
Japan	4	17,600
Norway	7	21,061
Poland	1	1,200
Roumania	.....	.....
Spain	2	10,699
Sweden	1	5,170
United States	.....	.....
For Sale or Flag not stated	59	149,275
Total	437	2,235,998

OTHER DETAILS

The following details concerning the ship-building work of the United Kingdom during the past three months may be added:

During ¼ ended Mar. 31, '22.		No.	GrossTons
Vessels commenced	*	18	49,208
	†	1	100
	‡	5	1,700
Vessels launched	*	61	307,760
	†	4	26,198
	‡	3	394

* Steam † Motor ‡ Sail

SIZE OF VESSELS UNDER CONSTRUCTION

The following table shows the vessels under construction in the United Kingdom classified according to gross tonnage:

Gross Tonnage	Number Steam	Motor	Sail
* 100 and under 500	43	5	9
500 and under 1,000	47	1	2
1,000 and under, 2,000	45	2	9
2,000 and under 3,000	20	3	—
3,000 and under 4,000	22	—	—
4,000 and under 5,000	22	3	—
5,000 and under 6,000	50	2	—
6,000 and under 8,000	76	9	—
8,000 and under 10,000	34	4	—
10,000 and under 12,000	4	—	—
12,000 and under 15,000	17	-	—
15,000 and under 20,000	18	-	—
20,000 and under 25,000	4	-	—
25,000 and under 30,000	1	—	—
30,000 and under 40,000	—	—	—
40,000 tons and above	—	—	—
Total	397	29	11

* Vessels of less than 100 tons are not included in Lloyd's Register Shipbuilding Returns.

MERCHANT VESSELS UNDER CONSTRUCTION ABROAD

Countries	Steamers and Motor Vessels: Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Sailing Vessels: Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Total No.	Total Gross Tons
United States—										
Atlantic Coast	23	127,071	2	350	..	....	3	4,345		
Gulf Ports	..	.....	..	.....	..	....	..	.....		
Pacific Coast	3	4,500	..	.....	..	....	..	.....		
Great Lakes	..	.....	..	.....	..	....	..	.....		
									31	136,266
British Dominions—										
Australia	8	18,000	1	350	..	....	..	.....		
Canada—										
Great Lakes	1	2,000	..	.....	..	....	..	.....		
Coast	9	10,264	..	.....	..	....	6	6,225		
Hong Kong	7	22,110	..	.....	..	....	..	.....		
Others	5	4,378	..	.....	..	....	1	175		
									38	63,502
Belgium	7	17,313	..	.....	..	....	..	.....	7	17,313
Brazil	1	2,170	..	.....	..	....	..	.....	1	2,170
China	7	8,170	..	.....	..	....	..	.....	7	8,170
Denmark	25	61,288	1	450	..	....	..	.....	26	61,738
Esthonia	3	1,701	4	790	..	....	13	4,040	20	6,531
Fiume District	7	7,259	2	600	..	....	..	.....	9	7,859
France	59	285,655	..	.....	1	600	..	.....	60	286,255
Greece	..	.....	1	600	..	....	..	.....	1	600
Holland	108	257,990	..	.....	1	250	..	.....	109	258,240
Italy	55	298,563	23	8,578	..	....	18	4,747	96	311,888
Japan	26	117,312	..	.....	..	....	..	.....	26	117,312
Norway	30	49,059	..	.....	2	475	..	.....	32	49,534
Portugal	..	.....	5	2,943	..	....	9	3,040	14	5,983
Spain	12	54,557	..	.....	..	....	1	150	13	54,707
Sweden	18	53,031	2	680	1	450	7	1,395	28	55,556
Total..	414	1,402,391	41	15,341	5	1,775	58	24,117	518	1,443,624

The total tonnage building abroad includes 325,000 tons upon which work is now suspended, the country mostly affected being Italy.

ANNOUNCEMENT

The firm of Kelvin, Bottomley & Baird, Limited, of Glasgow, Scotland, which was founded about fifty years ago by the late Lord Kelvin for the manufacture and sale of his well-known Navigational Instrument, has just established a branch company in Montreal under the name of Kelvin, Bottomley & Baird (Canada), Limited. The name of Lord Kelvin is indissolubly connected with all that is best and most perfect in this class of business and there are few British ships afloat that are not equipped with the "Kelvin" compass. The Montreal company plans to keep a large stock of instruments. They have secured as manager, Capt. Alexander Andrew, who is an expert compass adjuster and navigator, also carries an extra Master's ticket. The company's offices are located at 111 Commissioner St., Montreal, and Capt. Andrews will make this his headquarters and will always be at the service of vessels coming to this port. For some time past the firm of Drummond, McCall & Co., Ltd., have acted as agents for the Kelvin, Bottomley & Baird Co. and they will continue to be intimately connected with the company. Mr. J. T. McCall will be president and associated with him are Mr. M. B. Field of the Glasgow company and Mr. Wilfred O. White of Boston.

RESEARCH IN COTTON

Some time ago the British cotton industry formed a Research Institute which comprises, in addition to a Council Room and Library, laboratories for botanical, physical and chemical research, together with workshops and houses for the staff. The laboratories have been built and equipped on the most approved lines and are expected to produce results which will bring additional prosperity to the cotton industry in Great Britain.

AN IMPROVED FURNACE FOR CAST IRON

In every foundry throughout the world the cupola furnace is accepted as the standard to be used on account of its low first cost, its economy and its convenience. Such drawbacks as it possesses are not of serious importance in ordinary foundries, but they do become troublesome when high grade work is undertaken. A British firm has therefore devised a special type of cupola furnace for the production of the highest grade of castings. The chief peculiarity of this furnace lies in the oil firing of the receiver and the power of the oil flames can be regulated to suit the quantity of metal concerned. In this way any quantity of metal can be maintained for a long time at the correct casting temperature. The approximate consumption of oil is at the rate of three gallons per ton of metal.

Latest Movements of the C. G. M. M.

Montreal, May 15 1922

Steamer & Voyage		Sailed From	Arrived At	Sailed From	Arrived At	Routed
Aviator	(13)	St. John Apr. 28	L'pool May 9	L'pool May 13	Cardiff May 14	St. John-Glasgow Liverpool-Swansea - Cardiff.
Beaver	(12)			Montreal May 8		
Britisher	(1)			Vancouver May 13		
Carrier	(1)	Halifax Apr. 26	Demerara May 9	Demerara May 11		Halifax-Barbados - Trinidad-Demerara-Montreal
Challenger	(3)	Halifax May 8	Chatham May 12			Halifax - Chatham
Coaster	(7)	Halifax May 4	Charl-'town May 7	Charl-'town May 11	Psd. Canso May 11	Halifax-Charlottetown-Havana
Command'r	(7)	Montreal May 7	Psd. Cape Race May 11			Montreal-Antwerp - Rotterdam-London
Conqueror	(6)	Halifax May 2				Halifax - London-Montreal
Construct'r	(1)	Halifax Feb. 2	Melbourne May 8	Melbourne May 11		Halifax - New York-New Zealand-Australia-Montreal
Cruiser	(1)	Halifax Nov. 25	Boston May 6	Boston May 11	Off Whiteh'd May 13	Halifax - New-Zealand - Australia - New York - Boston-Montreal
Explorer	(4)			Montreal May 5		
Farmer	(16)	Vanc'v'r Apr. 19	Vict. May 13	Vict. May 13	Vanc'v'r May 14	Vancouver-Blaney - Nancoose-Union Bay Ocean Falls-San Pedro-San Francisco - Victoria-Vancouver
Fisher	(12)	Montreal May 10	Off Whitehead May 14			Montreal - Nassau - Kingston-Belize-Montreal
Forester	(11)	Halifax Apr. 20	Nassau May 12	Nassau May 12		Halifax - Nassau-Kingston-Belize-Montreal
Freighter	(2)	Vanc'v'r Mar. 20		Kobe May 10		Vancouver-Chemainus - Yokohama - Kobe-Vancouver
Gunner	(10)				Halifax Jan. 20	
Harvester	(7)	Halifax Apr. 11	Barbados May 2	Barbados May 3	Psd. Port Mulgrave May 14	Halifax-Barbados - Trinidad - Demerara-Montreal
Highlander	(4)	Vanc'v'r May 9	Chemainus May 10	Chemainus May 14		Vancouver-Chemainus-Vancouver
Hunter	(9)			Montreal Apr. 28		
Importer	(5)	Vanc'v'r Dec. 11		Muroran May 10		Vancouver-Victoria-Auckland - Sydney - Melbourne-Yokohama-Muroran-Vancouver
Inventor	(4)				Vancouver May 11	
Leader	(3)	Halifax Apr. 29	Colon May 12	Panama May 13		Halifax - Norfolk-Australia-New Zealand
Logger	(4)				Montreal May 9	
Mariner	(5)				Montreal May 4	
Miller	(11)	Halifax Feb. 28		Kembla May 9		Halifax - New York-Australia New Zealand - Montreal
Miner	(18)				Halifax Nov. 25	
Navigator	(15)	Mont'l Psd. Fame Point May 11		May 13		Montreal - Barbados-Trinidad-Demerara.
Observer	(18)	Vanc'v'r May 8	Ocean Falls May 12			Vancouver-Nanaima - Union Bay-Ocean Falls
Otter	(8)	St. John Apr. 1	Sydney May 14		Psd. Fame Point May 14	St. John - Glasgow - Sydney - Three Rivers - Montreal.
Pioneer	(8)	Mont'l May 5	Campbellton May 8			Mont'l - Campbellton - United Kingdom
Planter	(4)				Montreal Apr. 30	
Prospector	(6)	Vanc'v'r Apr. 4	Yokohama Apr. 28			Vancouver-Yokohama
Raider	(12)	St. John Mar. 29	London Apr. 20	London Apr. 29	Psd. Quebec May 15	St. John - London - Montreal
Rancher	(9)	St. John Apr. 5	London Apr. 21	London Apr. 28	Psd. Fame Pt. May 15	St. John - London - Montreal
Ranger	(15)	Halifax Mar. 26	London Apr. 22	London May 3		Halifax-Portland - London-Montreal
Recruit	( )				Stone Pillars Aug. 18	
Rover	(14)	Vanc'v'r Apr. 30	Ocean F May 3	Ocean F May 10		Vancouver-Blaney - Ocean Falls-Astoria
Runner	(9)	St. John May 2	Barbados May 11			St. John - Barbados
Sapper	(24)	Mont'l May 8	Charl-'town May 11	Charl-'town May 13		Montreal-Charlottetown - St. John's - Mont'l.
Scottish	(2)	Vanc'v'r Mar. 9	Sydney Apr. 30			Vancouver-Victoria-Lyttleton - Auckland-Dunedin-Sydney
Sealer	(14)				Halifax Dec. 25	

Seigneur	(13)	Halifax Apr. 6	Colon Apr. 26	Panama Apr. 26	Halifax - New York - Norfolk - New Zealand - Australia
Settler	(11)			Halifax Jan. 13	
Signaller	(8)			Halifax Jan. 18	
Skirmisher	(2)	Vanc'v'r Jan. 28	Manila May 10	Manila May 10	Vancouver-New Zealand - Australia-Manilla-Kobe-Yokohama
Spinner	(7)	Halifax	Melbourne Jan. 13	Melbourne May 8	Halifax - New York-New Zealand-Australia
Squatter	(8)	St. John Apr. 1	Swansea Apr. 27	Swansea May 4	St. John-Cardiff-Swansea-Montreal
Transp'ter	(2)	Vanc'v'r Apr. 15	Honolulu Apr. 26	Honolulu Apr. 28	Vancouver Auckland
Victor	(7)	St. John Dec. 6		Papeete May 1	St. John - New York-New-Zealand-Australia - Papeete - New York-Montreal
Traveller	(3)	Vanc'v'r Jan. 29		Gibraltar May 9	Vancouver-Genoa Bay-Moji-Colombo - Bombay - Port Sudan - Port Said-Gibraltar
Trooper	(14)	Mont'l May 13	Quebec May 14		Montreal - Quebec-Glasgow
Trapper	(12)	St. John Apr. 29	Chatham May 3		St. John - Chatham - United Kingdom
Volunteer	(12)			Montreal May 7	
Voyageur	(12)			Halifax Dec. 15	.....
Warrior	(9)			Halifax Jan. 19	
Winner	(6)	Vanc'v'r Apr. 29	Psd. Flattery May 8	May 9	Vancouver Yokohama-Shanghai-Takubar
Sheba	(3)			Halifax Dec. 3	
S.F.Tolmie	(1)			Vancouver May 10	
Advent'er	(11)			Midland Apr. 23	
Engineer	(2)			Goderich Dec. 1	
Pathfinder	(2)			Midland Dec. 4	
Sailor	(17)			Goderich Dec. 4	
Trader	(11)			Midland Dec. 6	
Sower	(13)			Midland Dec. 4	
Drummond	(7)			Midland Dec. 8	
McKee	(4)			Goderich Dec. 12	

THE KINEMATOGRAPH IN ENGINE DESIGN

A new type of petrol engine recently produced in Great Britain possesses many interesting features. It is designed to retain the essential advantages of the two stroke engine while avoiding certain disadvantages and difficulties usually met with in that type. In order to perfect the design the inventor carried out a series of experiments with the aid of a kinematograph apparatus for the study of the movement and velocity of gas. When under test this engine developed 10 horse power at 3,800 revolutions per minute, and when fitted to a motor cycle frame gave an average petrol consumption of over 60 miles per gallon. The use of castings requiring special care in the foundry has been avoided, and the machinery and erection have been made as simple as possible.

WORLD'S LARGEST LIFEBOAT

Arrangements have been made in Great Britain for building a new type of motor lifeboat which will be the largest of any yet known. Its length will be 60 ft. and its beam 15 ft. and its normal draught 4 ft. 6 in. It will be a 60 ton vessel propelled by twin screws, driven by two 75 horse-power oil engines, at a speed from 9 to 10 knots. It will be able to cruise for 100 miles without replenishing supplies. Two passenger cabins are provided, one at the bow and one at the stern, giving a total passenger carrying capacity of 150 people. Appliances are provided for supplying warmth and hot food and for rendering first aid to the injured. An interesting feature of the equipment is the provision of a searchlight and life saving net in addition to a gun for throwing a line over a vessel in distress. This vessel will be stationed on the Mersey.

SAFETY DEVICE FOR ELECTRIC HEATERS

One of the drawbacks of electrical appliances for heating water and other liquids is that if by chance the current is switched on while the utensil, such as a kettle or urn, is empty, the element gets overheated and is apt to burn out. In order to get over this difficulty some makers introduced a safety device in the form of a metal plug which melts at a comparatively low temperature and breaks the circuit, thus preventing overheating of the element. This method works fairly well but it has the objection that in order to bring the utensil into action again a new plug must be inserted. A British firm has therefore devised a safety appliance which is equally effective in action but which does not involve any part requiring replacement. It consists of a simple mechanical arrangement which cuts off the current when the utensil boils dry. All that is necessary to restore connection is to fill the utensil with water, when the device automatically re-sets itself.

TESTING PITCH

Pitch and similar substances are now very extensively used in road construction for the purpose of providing a waterproof and dustless binding material. In selecting this material it is very important to know its true consistency; and for this purpose the road engineer should test it for hardness at a particular temperature. Hitherto it has not been an easy matter to make this test, but a British firm has now produced a very simple and ingenious machine by which the business can be done quite easily. The principle upon which the machine works is that a steel point is allowed to bear on the material for a certain time under the pressure of a certain weight. The amount of penetration is registered by a pointer on a dial. By means of a pendulum which swings through a certain angle and operates releasing mechanism, the length of time of the test can be accurately fixed.

It is claimed, in fact, that the exactitude of this timing mechanism has never been approached in any earlier type of machine and that the readings are in consequence exceptionally accurate.

MARINE NEWS FROM EVERY SOURCE

Sarnia:—The wooden steamer J. C. Ford. owned by the North Shore Transit Co. has been sold to the Sarnia Coal & Dock Co., and has been towed across the river.

London, Eng—The firm of Yarrow and Co. Ltd. world famous for their small high speed craft, will be liquidated and reorganised as Yarrow & Co (1922) and Sir Alfred Yarrow will hand over the control to his son, Mr. Harold Yarrow.

Ottawa—It was announced in the Federal House, in answer to a question by Joseph Archambault, that the sum spent in the last ten years on the harbor of Toronto was in excess of $5,000,000 on Capital account.

Detroit:—The wreck of the "Annie Moiles" which was lying about 700 feet southwesterly of Tashmoo Park dock on the west channel bank of the St. Clair River has been removed and the buoys placed there to mark the spot have now been discontinued.

Napanee:—A daily service between Napanee and Picton has been inaugurated by the "Paradie," owned by Captain Ward, carrying freight and passengers. This will be a boon to the campers at Sans Soucie, Bogart's, Bartlett's and Thompson's Point.

Cleveland:—The movement in the ore trade is steadily increasing, and more shipping is being engaged, but it will be some time before the boats are fully employed. No action has been taken in regard to prices, and it will be next month before the regular traders get started.

Toronto—The lake steamer sailings are fast getting into their stride for the summer season, all the services being in force to a great or less extent. The regular season of the Canada Steamship Lines starts on the 10th June when the full Niagara service, as well as the Hamilton service will be inaugurated. The Grimsby route will be opened on June 17th.

New York—Great interest was manifested in the arrival of the White Star liner "Majestic," on her first voyage across the Atlantic. This vessel, the largest passenger ship in the world, was built in Germany, and was going to wrest the blue ribbon of the Atlantic from its present holders and bring it to Germany. However, Germany lost the war, and Great Britain got the "Bismarck" as she was called, and renamed her the "Majestic." She was not completed when the war ended, and the Germans had the annoyance of being compelled to complete the vessel and then see her sail under the British flag.

Port Arthur—The "Robert L Fryer" a grain transferring vessel owned by Fort William and Winnipeg grain interests has been sold to Charles Corson a grain dealer of Minneapolis. The price was $30,000 and was realised at public auction conducted by W. C. Muldoon, of Muldoon & Greene.

Port Carling—Construction is nearly completed on the new locks between Lake Muskoka and Lake Rousseau, after work has been carried on all winter. The new locks, having considerably greater capacity than the old ones, will do much to relieve the congestion that usually takes place at this point in the navigation season.

Port Huron:—Work is now going on in the effort to salve the hull of the ferry steamer "Omar D. Conger," which sank recently after the explosion of her boiler. The wreck is an obstruction to navigation, and will be raised and towed into the St. Clair River.

Port Arthur:—The C. S. L. freighter "Maple Branch," Captain Alexander Wilson, reported on her arrival here having passed wreckage in the vicinity of Caribou Point. The wreckage was too far away to be identified, but it is thought it may be from the tender "Lambton" now given up for lost.

Cleveland:—Latest reports from Cleveland state that coal is moving more freely from there to the upper lake ports, and the docks will be in good shape when the real movement gets started. The amount up to date has been 19,90 carloads, against 54,161 for the same period of last year.

Fort William—The bulk freighter "Midland King" of the Canada S.S. lines was in collision with the grain loaded "Glenfinnan" of the Great Lakes Transportation Co. The "Midland King" was light, both vessels were proceeding slowly on account of the fog, and it is not thought that any great amount of damage was sustained by either.

London:—The "Ayeready Salvage Syndicate" which has undertaken to salvage the "Lusitania" of her cargo, the syndicate to get 80 per cent. of all they recover, are waiting the end of the engineers' strike before getting to work. The divers will be provided with special suits to enable them to withstand the pressure at the great depth at which operations will be carried on.

Ogdensburg:—There was a loss of $250,000 involved when the steamer "Conestoga" loaded with wheat, burned to the water's edge in the Cardinal Canal. The fire started when the vessel was in the lift lock, but the crew stuck by her until she was out of the lock, several of them being badly burned during the time they were working her out.

Goderich—Although the original estimates for the deepening of the harbor of Goderich were set by the department at $8,500 a deputation from Huron County succeeded in convincing the Minister of Public Works that such a sum was inadequate, with the result that instead of $8500 the sum has been raised to $85,000 and will be included in the supplementary estimates of the department.

Detroit—As a result of a collision in the St. Clair River the tug "Annie Moiles" was sunk in about fifteen minutes. She was struck by the frieght steamer "T. F. Hutchinson" almost bow on, the result being a huge hole in the bows of the tug, through which she filled very rapidly. The steamer came alongside and rescued the crew of the tug before she foundered.

Hamilton:—A conference was held recently between members of the Harbor Commission, Board of Control, and Mr. J. M. Wilson, Engineer of the Federal Dept. of Public Works, with reference to harbor improvements. No agreement was arrived at on the question of handing over land at Stipes Inlet to the Harbor Commission, the Mayor dissenting.

Quebec—The new steamer "Gaspesian" purchased by the firm of Clark Bros. for the lower St. Lawrence trade, arrived at Quebec this month. She was formerly the "Albreth" of London. She has accommodation for about 100 passengers in two classes, and carries about 1200 tons freight, and will be a distinct acquisition to the lower St. Lawrence trade.

Halifax—The yacht "Grilse," formerly the yacht "Winchester" turned over to the Canadian Government at the beginning of the war, and utilised as a coast defence and patrol vessel, has again been sold this time to Mr. S. R. Guggenheim, the copper king. The "Grilse" is a speedy little craft, being capable of doing thirty knots. She will be taken round to New York for re-conditioning.

Ottawa—Mr. E. Jerome Dyer, C.B.E., a prominent resident of the Fiji Islands, visited Ottawa in company with Mr. Walsh, general secretary of the Canadian Manufacturers Association. His object was to interview the Government with the idea of having a service established between Canada and the Fiji Islands by the C.G. M.M. which would allow the fruit and other products of these islands to be sold at a much less cost in Canada than the Californian fruit.

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U. S. Wants Action

THE CANADIAN Government has been notified, through the British Embassy at Washington, that the U.S. Government wish to take up with them the question of the St. Lawrence deep water canal, with a view to negotiating the construction of this ambitious scheme. This is a report in an United States journal, though nothing official has been given out so far.

President Harding, it is said, is convinced that before any legislation can be passed, a treaty will have to be negotiated with Canada covering the whole question. The despatch goes on to say that the Canadian Government, while favorable to the project, does not wish it brought up at this time, and is very much embarrassed at having the matter brought before them, officially.

We do not know what the particular political exigency is that makes the United States President so anxious to push this matter forward, outside of the fact that the middle west states, which by their position are not very well fitted to understand much about such matters, are anxious for the scheme to go through. These states of course represent a lot of votes, and just as our own Government has to consult other things than its own inclinations, the U.S. executive has to keep his electors in view.

The Finance Minister has just been impressing on the people of Canada the fact that the national income is falling further and further behind the national outgo, and he is sore put to it to try and remedy this state of affairs. Under these circumstances, we believe that the last thing Canada needs is any project that will cost according to estimate $250,000,000, and which we are very sure will never be a practical proposition from a navigation point of view, whatever the possibilities may be for power development.

Those visionaries who in fancy see the "Majestic" sailing through the locks of the St. Lawrence canal system, and the further locks of the Great Lakes, till she reaches the port of Chicago, are dreaming dreams that may indeed some day be realized, but not in the lifetime of the "Majestic," which has just completed her maiden voyage.

What Canada needs is to concentrate on the problems that are staring her in the face at the present time, without burdening herself with new ones. When the National Railways have been put in a position where they can begin to pay something on the money that has been invested in them, and the National fleet has been disposed of, or gradually become obsolescent, we can begin to look around for new worlds to conquer. We need immigration of the right sort to come and settle on the land, and produce the agricultural wealth which can be sent overseas to pay for the things we must buy, and which will furnish the business to eventually make the railways something else than a burden.

If there was any particular benefit to Canada in the proposed deep waterway canal, we do not imagine the U.S. would be so anxious to go ahead with it.

Looking For Favors

IN THE correspondence from the city of Quebec, appearing in this issue, our correspondent draws attention to the plaint of the lumber exporters of the province of Quebec. These gentlemen find that they cannot compete with European lumber men, on account of the high freight rate between Canada and Great Britain. They suggest that in order to give them a chance, lumber should be carried in the vessels of the Canadian Government Merchant Marine, at a lower rate than that offered by private owners. Their argument is that it would be better for these ships to be carrying freight under the market rate than to remain tied up at the wharves, as so many of them are.

This, of course, looks all right to the lumber exporters, but how about the rest of the population. The cost of the C.G.M.M. did not come out of the pockets of any particular section of the community, but from the population as whole, always excepting those who find a means to dodge their taxes. We trust that there are few Canadians who are guilty of this practice.

This suggestion shows the temptation that always exists with a Government owned utility of making it, or trying to make it, serve the interests of one particular section of the community at the expense of the rest. If the steamers of the Government were to carry lumber to Europe or Great Britain at a less cost than the prevailing rate they would in all probability be doing so at a loss. This loss would have to be borne by the rest of the people, although the exporters themselves would of course pay a portion, but a very small portion. Freight rates are fixed by the supply and demand, and in the present condition, they are about as low as they can be to give any return on the shipowner's investment.

It may be argued that the general good of the country would be served by giving the lumber people a market abroad for their products, but it is doubtful if that would be the case. With the country short of houses as it is at present, it might be better to retain some of this lumber in the country to serve the home market, and assist in bringing down the building cost which is none too low at present. If the ships are laid up, it is because the general state of the freight market makes it impossible for them to find employment at a rate which will pay their expenses, and the idea of putting them into service at a loss, in order to create an artificial market for a particular trade, is an unsound one whichever way one looks at it.

The World's Largest Liner "Majestic"

Courtesy of "The Engineer"

ON the arrival of the Mauretania at Southampton on the first of the month, after her record run, the harbour presented an unusual and interesting spectacle, for there were berthed in it at the same time no less than four of the world's largest passenger ships. The Cunard Line was represented by the Mauretania, 30,000 tons, and the Berengaria—formerly the German Imperator—of 52,000 tons, while the other two were White Star liners, the Olympic, 46,000 tons, and the Majestic, 56,000 tons. The Majestic is of special interest, not only because she is the largest liner afloat, but also on account of her association with the pre-war competition for size and speed in Trans-atlantic liners to which she owes her conception. With the altered economic position and the present high constructional costs, it is very likely she will continue to retain her distinctive position for some time to come.

Originally built to the order of the Hamburg-Amerika Line at the Elbe shipyard of Blohm and Voss, Hamburg, and christened the Bismarck, work on her was well in hand when the outbreak of war came, and was continued till about the middle of 1916. After that time little progress was made, and about that period all copper pipes were removed and replaced by pipes of steel, which have for the most part been retained.

By the Versailles Treaty it was provided that vessels under construction should be completed by the Germans as designed and handed over to the Reparations Commission. Some twenty-five ships were allotted to England, representing a gross tonnage of 255,000 tons, of which the Bismarck was one, and all of these vessels, except one of 18,000 tons, have now been delivered. The White Star Line purchased the Bismarck from the Reparations Commission and, re-naming her the Majestic, began nearly a year ago to supervise her completion, and at the same time introduced such modifications as were necessary to bring her into line with the standard White Star practice. This work was carried out under the direct supervision of a special staff of Harland & Wolff and White Star engineers and naval architects, at a cost of about three-quarters of a million pounds, and we understand that the builders gave uniform courtesy and assistance.

General Particulars

The Majestic has an overall length of 956 ft., and is 100 ft. broad, with a gross tonnage of over 56,000 tons, and a displacement of 64,000 tons when loaded to her marks. Her height from keel to boat deck is 102 ft., and the look-out man in the crow's nest is perched 180 ft. above the water line. Her sister ship the President Harding—launched as the Vaterland and afterwards named the Leviathan—is a little shorter and slightly broader, with a less measurement of some 2,000 tons. The President Harding is now being reconditioned by the United States Shipping Board. A special feature in the design of the Majestic is the arrangement of her decks. Above the five steel decks, which run from end to end of the ship, there are four steel-plated erection decks which cover at least half her length. The boiler casings, instead of passing up the centre of the vessel, are divided and placed towards the sides of the ship, and are then carried up above the top deck, where they unite to form a centre superstructure for the funnels. This method, which is adopted for two of the funnels—the third being a dummy funnel—permits of better ventilation for the boiler-rooms, and from an architectural point of view admits of great breadth in the disposition and size of the cabins and public rooms throughout the seven decks on which most of the first-class passenger accommodation is provided. The main entrance is situated about amidships, and, in addition to electric elevators, two main staircases, one on each side of the ship, rise from deck F to deck A. The vestibule is very lofty, and permits a free view into the dining saloon, which room has a total area of 11,350 square feet and a height of 31 ft. at the centre of the middle part, the sides supported by wide-spaced Ionic pillars. The vestibule is repeated throughout the five decks, and a broad central passage, on each side of which are grouped state rooms and cabins, leads to the other first-class staircase, which is situated in the forward part of the accommodation. The main staircase ends on the level of the large vestibule between the lounge and the palm court, 11ft. above the promenade deck, and gives access to the wireless station and gymnasium. The rooms on deck B deserve particular mention. The lounge is entered through an arch formed by the two casings leading to the second funnel, and there is a clear uninterrupted view for 250 ft. from the stage in the lounge at the forward end through the main entrance of the palm court and the raised restaurant at its after end.

Other rooms we may briefly refer to are the reading and writing rooms, the library and the well-proportioned smoking-room, from which, through large curved glass windows, an excellent view over the bow and the sides of the ship is obtained. One of the features of the vessel is a swimming bath, which is placed forward of the main entrance on deck E. The basin has an area of 820 square feet, and may be filled with 120 tons of warm sea water in about twenty-five minutes.

The Majestic has a full complement of over 5000 persons, this number including 850 first-class passengers, 545 second-class passengers, and 2392 third-class passengers, with a crew of over 1100.

Machinery

The Majestic is driven by four four-bladed propellers, each with a one-piece boss, made by the Manganese Bronze Company, Limited, of London. The propelling machinery consists of quadruple turbines of the combined impulse and reaction type, Curtis wheels being fitted before the Parsons drums. The turbines are arranged in two engine-rooms on the port and starboard. The steam enters the high-pressure turbine on the port inner shaft, and passes on to the intermediate-pressure turbine on the starboard inner shaft, from where, equally divided, it again passes to the two low-pressure turbines on the outer shafts. Each separate shaft, however, is available for running or manoeuvring by itself, but under ordinary working conditions the two low-pressure turbines operate in parallel. The total ahead horse-power is 66,000, and the astern power 36,000. According to contract, the vessel should travel at a speed of 23 knots when loaded to a mean draught corresponding to a departure draught of 35ft. 6in., and when the turbines are developing 66,000 shaft horse-power at a speed of 180 revolutions per minute, with a boiler pressure of 235 lb. per square inch. Actually on her run from Cuxhaven to Southampton she developed over 70,000 horse-power and a speed of 25 knots was reached. The astern turbines are subdivided into high-pressure and low-pressure turbine, and the low-pressure turbines are again placed on the outer shafts. By-pass valves are provided whereby high-pressure steam may be supplied to the other turbines, should at any time excess steam warrant this procedure. Thrust blocks of the ordinary pattern are provided. The turbines exhaust into pear-shaped condensers, and Weir's dual air pumps are installed. The turbine controls are all worked from a special control station placed above the engine-rooms, and all the main valves are hydraulically operated and electrically controlled. The boiler installation consists of forty-eight water-tube boilers of the Yarrow-Normand type, which are fitted with oil burners working on the White low-pressure system, and the boilers are accommodated in four boiler-rooms. They are designed for a working pressure of 250 lb. per square inch,

and were tested to nearly double that pressure. The combined heating surface is over 219,000 square feet, and the total grate area exceeds 4,000 square feet. We noted with interest that the boilers were fitted throughout with Mumford's patent automatic feed controls. Aft of the main engine-room, is an outer engine-room, containing five A. E. G. eurbo-generating sets, each having an output of 230 kilowatts A large central switchboard is provided, from which the lighting and power requirements of the ship may be controlled. Current is supplied to over 15,000 electric lamps, in addition to various motors. On E deck a special 70-kilowatt oil-driven emergency dynamo is installed, which is of the Diesel type. This machine is driven by an A. E. G. two-stroke cycle opposed-piston type engine, with two vertical cylinders, which, along with its generator, is completely enclosed. The emergency set supplies current for the lighting and wireless installations, and also provides power for the six 20 horse-power motors which operate the Welin boat-handling gear.

Electrical and General Equipment

The system of telegraphs and telephones installed throughout the ship is very complete. Among the former may be mentioned the engine telegraphs, the starting telegraphs and rudder tell-tale, also the docking and anchor telegraphs, the boiler-room telegraphs and the distant revolution telegraph. A loud-speaking telephone system is installed for operating the ship and for communication between the engine and boiler rooms, and this system is so arranged that any boiler-room can speak to any other boiler-room or to the engine-rooms and the engineers' department. Communication between the look-out man in the crow's nest and the bridge is established by a loudspeaking telephone, in addition to the ordinary telephone. The ordinary telephone system for executive and departmental use has its own central exchange, which may be connected to shore when the vessel is berthed.

There are three wireless stations, and the largest is capable of maintaining permanent connection with both continents during the whole of the voyage. A smaller station is used for communication over a distance of 800 miles, and a subsidiary one is reserved for use in case of an emergency. In addition to the usual signalling arrangements, special provision has been made to guarantee as far as possible the safe navigation of the vessel in fog. Submarine signalling gear has been installed, and the W llett Bruce electric fob bell and whistle fitted. The fire alarm system includes some 450 fire alarms, distributed throughout the ship, which automatically indicate to the officer on watch when the temperature in any compartment has been exceeded. This system is centralized on the navigation bridge, and is combined with a smoke-detection device, consisting of lines of tubing through which air may be drawn. Other signals which are shown on the navigating bridge are the water-tight door indicators and the cooling-room door tell-tales. Electric clocks are fitted throughout the vessel. Every precaution has been taken to reduce as far as humanly possible dangers which might arise in case of fire or collision, and an ample complement of lifeboats is carried, including two motor lifeboats fitted with wireless. All boats are swung and lowered on the Welin system, which, as previously mentioned, is electrically operated. A somewhat novel fitting is the Fram night lifebuoy, which may be instantly released from the bridge by electrical means. Fram anti-rolling tanks are also fitted in addition to the usual bilge keels.

From what has been said, it will be appreciated that the Majestic is a vessel which reflects credit on her builders, those who have supervised her completion, and the flag under which she sails. Her maiden voyage began on Wednesday last, when she left Southampton for New York under the command of Sir Bertram Hayes. Before her departure, the White Star Line—her owners—provided an opportunity of inspecting her. In welcoming the guests present on that occasion, Mr. Harold Sanderson, the chairman of the company, made the interesting announcement that a provisional agreement had been made with the London and South-Western Railway whereby they hoped that within the next twelve months a suitable floating dock would be provided for this vessel at Southampton.

BRITISH SHIPBUILDING

On Tuesday, the 14th inst., there was launched from the Neptune Works, Newcastle-on-Tyne, of Swan, Hunter & Wigham Richardson, Ltd., a twin screw motor vessel which is being constructed to the orders of the Cia. Generalde Tabacos de Filipinas of Spain.

The vessel is intended for the carrying of oil, having fourteen tanks arranged to carry oil cargo and one hold forward intended for general cargo, the total amount of fuel, stores, etc, being about 6.100 tons. She is about 377 ft. in length x 49 ft. breadth x 28 ft. 9 in. in depth and is being constructed to attain the highest class in Lloyd's Register. Her oil fuel is carried in tanks at the sides of and under the engine room and in a deep tank forward, the total amount being over 500 tons.

The engineers and greasers will be accommodated aft in deckhouses on the poop; the captain and officers will be in deckhouses amidships; whilst the crew are in the forecastle.

The auxiliary machinery for working the cargo and vessel herself will be of the most improved and up-to-date kind, including Hele-Shaw steering gear, steam winches, etc., etc.

The propelling machinery consists of twin screws, each driven by a set of "Neptune" marine oil engines, of the two-cycle, port scavenging long stroke type, with 6 working cylinders, each set being designed to develop about 1,000 B.H.P. These engines are also being constructed by Swan, Hunter, & Wigham Richardson, Ltd., at their Neptune works. The scavenging cylinders are placed underneath the working cylinders, and are used for starting and reversing the main engines with low pressure air. There will also be a very complete installation of forced lubrication. The main compressors will be driven from the main engines, but all the other engine room auxiliaries will be electrically driven.

As the vessel left the ways she was named the "ARNUS," the naming ceremony being gracefully performed by Madame Guijarro, wife of the Spanish consul in Newcastle-on-Tyne.

The launch was witnessed by a goodly number of visitors amongst whom were Mr. Marcus Samuel, the representative in England of the owners, Mr. Flannery of the firm of Flannery, Baggallay & Johnson Ltd., of London, Eng.

* * * *

On Thursday, the 11th inst., Swan, Hunter, & Wigham Richardson Ltd., launched from their Neptune Shipyard, Walker, Newcastle-on-Tyne, a telegraph cable repairing steamer, which is being constructed by them for the Commercial Cable Co. of New York.

This vessel, called the "Marie Louise Mackay," is a smaller vessel than the cable steamer "John W. Mackay," launched by Swan, Hunter, & Wigham Richardson Ltd., from their Neptune works for the Commercial Cable Co., in November last. She is 246 feet in length by 34 feet in breadth by 24 ft. 4 ins. in depth, and will be propelled by twin screw machinery.

She will have two masts, an overhanging bow as usual for the cable sheaves, and will be arranged to carry water ballast in both the fore and after peaks and in the double bottom, whilst her oil fuel will be carried in a cross bunker. There will be a hold forward for cable stores, etc., etc., refrigerated room for the ship's use aft, and ample storeroom capacity.

The cable will be carried in three cable tanks placed forward of the propelling machinery, and having a total coiling capacity of about 18,000 cu. ft. The machinery required for working the cables includes picking up and paying out gears, Lucas dynamometers, and a Lucas patent sounding machine, and is being supplied by the Telegraph Construction & Maintenance Co. Ltd., of their latest designs.

The accommodation for the staff engaged in navigating the vessel, and in working the cables is specially designed for their comfort in the service on which the steamer will be employed. The captain's accommodation is arranged on the navigating bridge, where also is fitted a large glazed shelter affording ample accommodation from the weather for all on duty there. The rooms for the other officers, navigating and cable, are on the awning and main decks amidships, and include a very comfortable

dining saloon amidships, whilst the petty officers, cablemen and seamen are on the main deck aft.

The comfort and safety of all on board have been carefully studied, and the fittings include wireless telegraphy, ample ventilation, steam heating, electric light and bells, telephones, etc. etc.

The auxiliary machinery for navigating and working the vessel is of the latest and most improved pattern, including steam windlass forward and steam capstan aft, steam winch, steam boat hoist, steam stearing gear, etc., etc.

The propelling machinery which is also being constructed at the Neptune Engine Works by Swan, Hunter, & Wigham Richardson Ltd. will consist of twin screw triple expansion engines, supplied with steam by two boilers working under Howden's system of forced draught and fitted to burn oil fuel on the Wallsend-Howden system.

The naming ceremony was witnessed by a goodly company and was gracefully performed by Mrs. Lardner, wife of Commander F. H. Lardner, O.B.E., of the Commercial Cable Co., under whose supervision the "Marie Louise Mackay" is being designed and built, and who was also present. Amongst others present at the ceremony were Mr. Stevenson representing Mr. H. F. Russel, manager in London for the Commercial Cable Co. who was unable to be present, and Mr. and Mrs. R. J. Hughes, plant manager in London for the Commercial Cable Co., Mr. A. P. Crouch, Mr. Dewardt, Mr. and Mrs. Heurtley, Mr. Sleap, Mr. Hibberdine, Mr. Higginson and Miss Barnard, as well as Mr. J. Denham Christie, Mr. G. F. Tweedy and Mr. C. S. Swan, directors of Swan, Hunter, & Wigham Richardson Ltd.

SPEED CHANGING BY WORM GEARING

James Watt was a strong advocate of the worm gear, but owing to the difficulty of making this gear in efficient form it was not very largely used during the 19th century. Of late years, however, engineering practice has advanced so much that it is possible to make worm gears of the highest quality at a moderate price. Many engineers have therefore reverted to the principles laid down by the famous inventor, and we now find worm gears recommended and used for vehicle driving and other purposes where they were once regarded as hopelessly inefficient. In view of the interest recently taken in worm gear, it is really remarkable that the first patent for the use of the worm gear for speed reduction and speed changing has just been taken out. A British inventor has obtained patents all over the world for this application. In his device the usual spur wheels are entirely absent, and nothing but worm wheels are used. In his speed reduction gear, the first shaft carries a worm which drives a worm wheel on a second shaft at right angles to the first. This second shaft carries a worm driving another worm wheel on a shaft at right angles to the second shaft. This third shaft in turn carries a worm wheel on a shaft at right angles to it, the final effect being that the fourth shaft is in line with the first shaft and is driven by it at a speed reduced three times. This type of gear has been applied already to the driving of a mechanical stoker and to motor car accessories. In the case of the mechanical stoker the reduction is in the extraordinary ratio of over 27,000 to one—a result which could not possibly be obtained by means of ordinary gearing unless it were made of preposterous dimensions. In the case of motor car speed changing gear several ratios can be obtained with remarkable simplicity. The distinguishing feature of the gear is its small size in relation to the high reductions it provides. The inventor claims that the gear has an efficiency between 80 per cent. and 90 per cent. where the reduction is less than 250 to 1.

BRITISH MOTOR LINERS

Excellent results continue to be obtained by the oil driven ships constructed in Great Britain. Recently a large passenger liner equipped with oil engines completed a round voyage from the United Kingdom to India and back; and the commander of the ship reported that the engines "ran like a sewing machine." Even at the present heavy price of oil the voyage showed a considerable economy in the cost of fuel in comparison with coal. The passengers benefited from the absence of coaling on the voyage and by the minimising of vibration. The daily consumption of oil at 14 knots was less than 18 tons. Another British oil-driven ship proved on her trials that she could run at 13 knots on 16 tons of oil per day. The oil is carried in the double bottom of the vessel and there is sufficient capacity for a voyage of 30,000 miles.

BRITISH EMPIRE EXHIBITION

Active work has already begun in preparation for the great British Empire Exhibition to be held near London during 1924. The most up-to-date machinery and methods are being employed in the constructional work for this huge display of industrial and artistic achievements. In the excavation work for the sports arena the contractors are using a gigantic machine which can excavate 200 yards of material per hour. The plant is steam driven and mounted on caterpillars, and it carries a 60 feet boom with a bucket of two cubic yards capacity. The complete operation of excavating and delivering an overflowing bucket load is about 35 seconds. In connection with the exhibition arrangements are being made for an international conference on the subject of "Power." British engineering groups are inviting experts from overseas to discuss every phase of this important question.

A STEAM TURBINE LOCOMOTIVE

Ever since the steam turbine—which was invented by Sir Charles Parsons in Great Britain—proved its wonderful advantage on board ship and for electric power generation, railway engineers have been looking forward to the possibility of applying it to locomotives. A bold experiment was recently made by a leading British locomotive factory, which constructed a turbo-electric locomotive, now being tested on the rail. The main turbine on this locomotive drives an electric generator which supplies power to four motors arranged in two groups on the front and the rear respectively of the locomotive. Each of these motors is capable of developing 275 horse power. One of the novel features of this locomotive is the condenser, in which the steam tubes revolve in water at a slow speed. The makers claim that this locomotive gives considerable saving in both fuel and water compared with the existing types.

A 500 HORSE POWER ELECTRIC BOILER

To many people it will seem absurd to use electricity for making steam; but this is actually being done—and for a very good reason—on British railways. The railway systems in Great Britain are gradually being electrified where the conditions are favourable; and the result is that on certain routes steam haulage will be at work on one portion and electric haulage on another. The usual practice is to heat steam trains with the steam from the locomotive, and obviously this method cannot be continued when the steam locomotives are replaced by electric locomotives. Experiments have therefore been made with boilers heated by electricity, and tests made with one of 50 horse power have been remarkably successful. The efficiency of this system of heating is very high and the life of the elements is, owing to skilful design, very long. Plans are now being got out for a 500 horse power boiler, large enough to maintain the steam supply for a full size main line train.

BOOK REVIEW

"Dock and Lock Machinery" is the title of a technical manual from the pen of W. Henry Hunter, M.I.C.E; M.A.S.C.E. Mr. Hunter is well qualified to write on such a subject, as he was the consulting engineer for the Manchester Ship Canal, and one of the Board of Consulting Engineers on the Panama Canal. The subject is treated from its early beginnings, and profusely illustrated, and should be a valuable source of reference and information for anyone who has to do with this side of engineering. The book is published by D. Van Norstrand Company, New York.

"Tout Passe"

(Everything Changes)

THE FRENCH have a proverb which begins "*Tout passe*" (Everything changes). This contains the germ of an idea which should be good medicine for the business man who is inclined at the present time when trade is quiet to rest on his oars and delay making preparations for the busy period until that period actually arrives.

Everything in this world is continually changing. Some philosophers even tell us that there is no present; there is only the past and the future; the past is gone and to-morrow, even the next hour, the next minute, are in the future. And in the future only one thing is certain, that is, change.

So conservative is human nature that the great majority instinctively assume that whatever conditions exist at the moment must continue to exist for some time to come. The direct contrary is, of course, the case. The philosopher knows that whatever else may happen one thing is certain, viz., whatever is, is not going to continue.

Why is it that only the few can make money in stock exchange speculation? Because the ordinary man waits until prosperous times appear to him to have become established and to have become a permanent institution before he buys. And in most cases he then finds he has bought at the top of the market. On the other hand, when things are at their lowest and he could buy with a prospect or almost a certainty of profit, everything appears to him black and he cannot see any likelihood of change. The shrewd operator, however, knows that when things look at their worst it is time for them to mend. This is the time he chooses for buying and when everything is booming is the time he picks for selling.

We may not be on the eve of a big boom, but one thing is certain, things are not going to remain as they are for long.

Now is the time when shrewd and far-seeing men are preparing for prosperous times. They are making preparations so that opportunity may not take them unawares. They see that now is the time to cultivate trade and make their products known so that when the tide of prosperity is on the flow they may be in a position to take advantage of it and reap the benefit of their foresight.

If anyone tells you we are in for several years of business depression, take heart and be assured that this is a sign we must be nearing better times.

In the spring of 1918 many well-informed men predicted three further years of war. The war ended that autumn.

In 1920 many business men spoke of three or four more years of prosperity. The prosperity wave was even then on its ebb.

These men like the great majority did not realize that everything changes. Are you going to place yourselves among their number, or are you going to rank among the minority and bear in mind the proverb—*Tout passe?*

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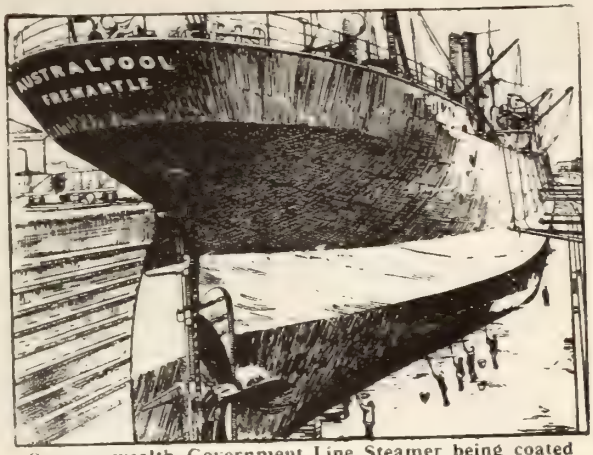

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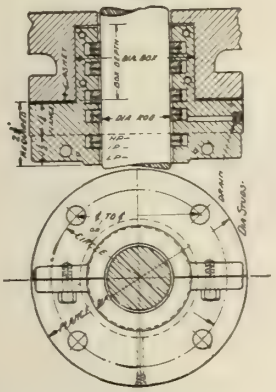

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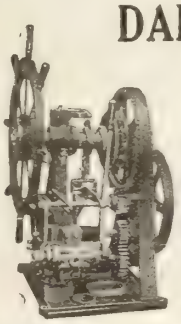

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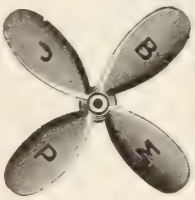

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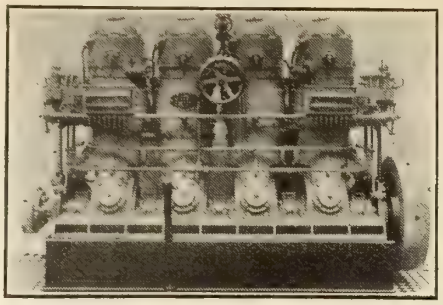

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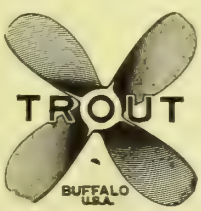

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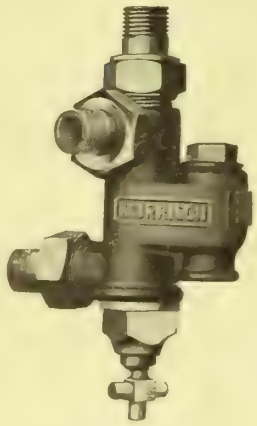

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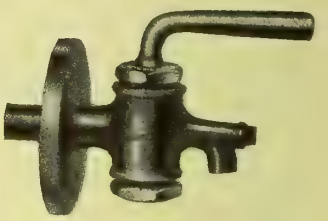

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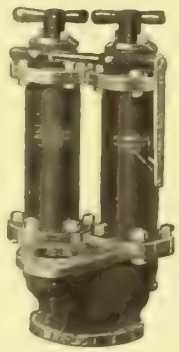

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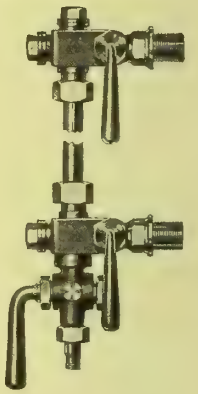

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VOL. XII. PUBLICATION OFFICE, TORONTO, JUNE, 1922 No. 6

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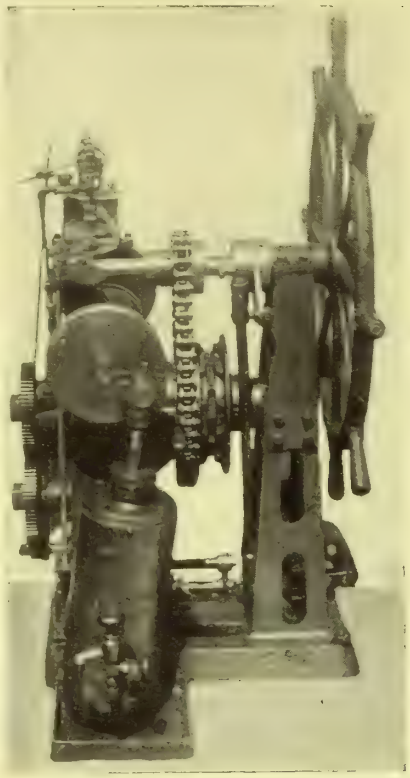

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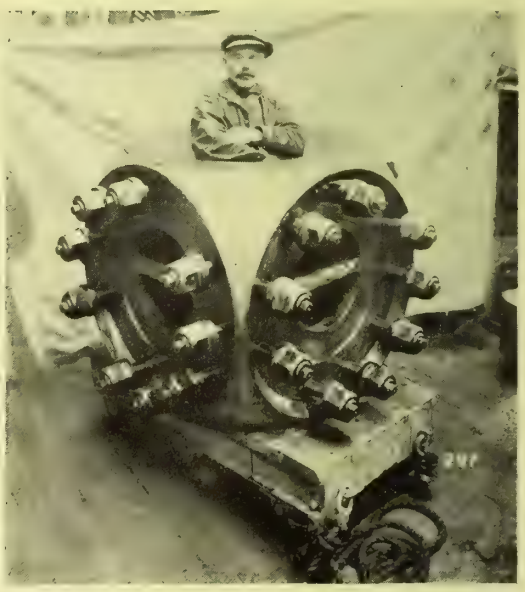

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A monthly review of shipping and maritime matters in Canada and abroad. Published by The MacLean Publishing Company, Limited.

News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

The shipping trade in connection with the ocean traffic of the St. Lawrence route this season of navigation shows no improvement. This is unquestionably due to the complex political situation in Europe, and Russia and Germany in particular. It is very evident that the big and expensive liners are the hardest hit judging by the small amount of freight they are bringing to Canada on their westbound sailings, as well as the small cargoes they are carrying on the east bound trips. Up to the present time of writing, it is not unusual to see big liners arrive at Quebec with little or no cargo, and their passenger lists proportionately small. In fact they are negligible in comparison with former years, and were it not for the tourist traffic from Canada to Europe the big liners would be operating at a loss. This applies to all steamship companies, including the Canadian Pacific which however is the most favored, and its passenger steamers the largest carriers. As an indication of the falling off of the passenger traffic from Europe to Canada, it may be pointed out that the White Star line steamer "Megantic" one of the largest and finest vessels on the St. Lawrence route, arrived here recently with only 262 passengers. These were made up of 16 cabin, 82 second cabin, and 164 third class. This is however an unusual example, as the "Megantic" generally has a full passenger list.

The falling off in the cabin passenger traffic from Europe is attributed to the unsettled commercial and industrial activities in the old world, and the slow recovery towards normal in the United Kingdom and France. But the outstanding cause is due to the great falling off in immigration, especially from the British Isles for which the Canadian Government by its restrictions are responsible. The cancellation of these regulations in the beginning of May, by the present Government, came too late in the season to be of much benefit this year, for as a rule the people of the United Kingdom decide to emigrate, devise their plans, and make their preparations in advance with a fixed idea in their minds as to which country they will emigrate to for settlement. The Australian Government well aware of these characteristics took advantage of the Canadian Government restrictions to offer inducements to the British peoples intending to emigrate to Australia, with the result that an immense number are flowing from the U. K. to Australia.

New Zealand went one better by giving the British emigrant free passage out; with the result that very few emigrants are coming from the United Kingdom to Canada, and a number of these are being induced to come on account of having relatives and friends already settled here. The Prairie Provinces are making redoubled efforts through their respective Government agencies to entice the British emigrant, as well as the Canadian Pacific Railway and its steamship service, and if it were not for these efforts, the emigrants this season would be practically nil.

These conditions account for the unusual smallness of the passenger traffic in the big and expensive ocean liners of the various steamship companies engaged in this trade.

There is another factor to account for the falling off of cargoes, which is attributable to the high ocean freight rates, which have in a large measure interfered with the export trade to the United Kingdom. Up to the beginning of last April the shipping combination, in which was included the Canadian Government Merchant Marine fleet, demanded 100 shillings per standard of deals and timber for the British Isles. This high rate prevented the Canadian exporting firms from taking orders last winter from British firms, except in emergency cases for small orders. The rate was reduced to 85 shillings in April, too late, however, to sell Canadian wood, as the selling representatives of the Quebec export houses who went abroad last winter had returned to Canada.

But even this new rate is in excess of pre-war rates, and too high to enable the Canadian lumber exporters to compete with European sellers who are so much closer to the British market. For this reason there were very few shipments from the port of Quebec in 1921. And prospects are no brighter for 1922. Up to June 15th only 2,000,000 feet of lumber and deals were shipped as part cargoes in independent steamers, which were cargoes to fill in part orders left over from last season. Inquiries have been made from British firms in May and June, but the prices offered, in consideration of the high cost of freight did not interest the Quebec lumber dealers, hence no sales were made. The Canadian shippers here are endeavoring to persuade the steamship companies to lower their rates to 70 shillings, but will accept a reduction to 75 shillings, which it is calculated will give a fair profit to the steamship interests. These high freight rates account for the dullness in the shipping trade at the port of Quebec, as the shipment of timber and deals is of the highest importance.

Discrimination

At the same time the port of Quebec owes a good deal of its inactivity to discrimination. The head offices of all British shipping companies are located with Canadian agents at Montreal, and notwithstanding the distance of 180 miles between the port of Quebec and Montreal, the loss of time in sailing of steamers from Quebec to the latter port, the waste of coal, expensive pilotage, insurances, etc, as well as the dangers of the narrow artificial channel, these agents at Montreal oblige all vessels to pass the port of Quebec.

Oil Fuel Equipment

The Louise Docks have had added to

their equipment a 55,000 ton barrel capacity oil tank with heating coils and two pumps, one of which has a capacity of pumping 750 barrels per hour, and the other 1,200 barrels per hour, for the accommodation of oil steamers navigating the St. Lawrence. This oil tank with its power hose has been installed at the west end of the docks, by the St. Lawrence independent Oil Co., Ltd. and Quebec is now the only port on the North Atlantic at which dock vessels can obtain fuel oil at their regular discharging berth. At all other ports, the fuel oil is either lightered, or vessels require to be moved to the oil loading berth.

The tank power house is equipped with two boilers, 126 h. p. each, ten-inch intake pipes, for filling the tank, situated within 250 feet of the tank, and approximately 4,500 feet of ten-inch pipe line to carry oil to the vessels loading or discharging, without interruption, at their berths either in line with sheds 24 and 25, at the Louise Docks breakwater pier, or their berths at sheds 27 and 28, paralleling the St. Charles River.

Grounding of S. S. "Montcalm"

The grounding of the Canadian Pacific steamer "Montcalm" is an object lesson to steamship owners who persist in sailing their deep draught vessels up through the narrow, dangerous and shallow channel to the port of Montreal. The 16,400 ton steamer is one of the new vessels of the Momo class. She left Montreal in the forenoon of June 2, en route to Liverpool with passengers and 4,000 tons of cargo. Though it is frequently given out to the shipping world, that the channel between Montreal and Quebec is 30 feet in depth, from constant dredging, this depth is looked on with suspicion, and the better informed river men make the statement that the depth is never more than 29 feet, and that is in the spring up to the month of June, when the smaller tributary rivers, including the Ottawa, feed the upper St. Lawrence with their waters. From the first week of July or in the heat of the summer, when the smaller rivers commence to dry up, and the waters in the channel between Montreal and Quebec commence to lose this depth, and, in the early August and following, the depth in the channel is not more than 27 feet, and not sufficient to float the big ocean liners such as the "Montcalm."

The "Montcalm" grounded in the shallow water, fifteen miles north east of Three Rivers. After removing part of the cargo, the baggage of the passengers, express packages, and mail, the vessel was hauled off with the aid of five tugs, and taken to Quebec. Her passengers were transferred to the Canadian Pacific steamer "Melita" and the White Star Dominion liner "Canada."

After discharging the remainder of her cargo in the St. Louis Dock, she was taken over to St. Joseph de Levis, and placed in the large graving dock there for surveys and repair. It was found that 25 plates were sprung, one half of which will have to be replaced. The Davie Shipbuilding Co. is making the repairs, which are expected to be completed before the end of June.

Montreal Notes

The White Star-Dominion Line have had the freighter "Irishman," which was formerly on the New York run, diverted to Montreal. She arrived in port on June 6th and loaded one thousand head of cattle for Avonmouth. This is the largest cattle cargo that was ever shipped from Montreal. At the same time the steamer is a twin screw boat of 21,000 tons, which is the largest freighter that ever docked at Montreal.

The Canadian Pacific Steamship, Limited, Steamer "Montcalm," which left Montreal on Friday, the second of June, ran aground about ten miles below Three Rivers the same afternoon. The accident occurred in broad daylight and in a straight stretch of the river which is not considered dangerous. The cause of the accident, as announced by the company, was that the steering gear was jammed. Four large tugs were sent to her assistance but were unable to move the liner. At high tide about daybreak on Sunday morning, June 4, the four tugs together with the engines of the liner were put into play and the steamer was released.

The steamer proceeded to Quebec under her own steam. She was docked at the Davie Shipyard at Lauzon. Capt. Walsh of the Canadian Pacific Steamships, Ltd., examined the liner and stated that there was but little damage done. Some of the bow plates were sprung and a little water was made by the steamer. It will be necessary for the steamer to miss one round trip. Her passengers were taken forward by other liners.

Mr. P. L. Miller, general manager of Canadian Vickers, Ltd., recently stated that the inquiries for the Sea Sled, the new type of motor boat that the company is manufacturing under the Hickman patents, have come not only from all over Canada but from points as far away as South America. The number of inquiries is very encouraging as many of the prospective purchasers plan to place the boats in commercial work. Mr. Miller confirmed the rumor that the large Sea Sled now being built at the plant, would likely be run up the Lachine Rapids, to test its ability to navigate in turbulent waters. The company have secured selling rights for four of the adjacent New England States, and if business warrants will probably erect a small plant on Lake Champlain to build these boats.

Thirty-seven members of Parliament all representatives of western grain-growing constituencies, accompanied by eight members of the parliamentary press gallery, visited the Port of Montreal on Saturday, May 27, in order to get an insight first hand into the workings of the port and the manner in which grain is trans-shipped from lake carriers and railway cars to ocean going vessels which carry it to Great Britain and the continent. They came as guests of the Harbor Commissioners and spent the entire afternoon in touring the port. Before the trip around the harbor the visitors listened to an address by M. P. Fennell, general manager of the port, in the commissioners' offices, and partook of luncheon on the steamer Sir Hugh Allan. The party arrived at Bonaventure Station at 1.15 p. m. where they were welcomed by the Commissioners, Dr. McDougald, Mr. Emilien Daoust and Dr. Milton L. Hersey. From the station they were motored to the commissioners' building where they listened to Mr. Fennell's address which covered the development of the port since it first came under government control in 1830. Mr. Fennell described the programme of development and extension instituted in 1909, which has just been completed and said that further developments were urgently needed as the port was working its facilities to the utmost in order to maintain its reputation for efficient handling and despatch of freight. The general manager endeavored to explain the operation of the port in detail and gave a statement of the working costs as compared with ports of New York, Boston, Philadelphia, and other American sea ports. The party after viewing the quarters of the Grain Clearance Board and having its operations explained proceeded to the Sir Hugh Allan, where they had lunch. In this steamer they cruised down the harbor to the Imperial Oil Company's wharf at section 101. Here the parliamentary visitors embarked and were taken by a special car attached to one of the commissioner's locomotives which brought them back by rail to the cold storage plant. On the journey the system of electrification of the harbor terminals was explained and it was announced that the electrification will be completed by August, 1922. On arriving at the cold storage plant the visitors were conducted through the ten floors of the building and all expressed amazement at its size and the completeness of its equipment. The western representatives were interested in seeing several rooms which were filled with western beef, eggs and butter. Several members afterwards said that their constituents had no idea of the existence of such a plant and they would make it their duty to inform them on their return. The party then visited elevator No. 2, the lower and upper floors of the sheds on King Edward Pier, and elevator No. 1.

The large number of vessels in port to load grain had necessitated in many cases the berthing of two or more ships

at the same dock, and the members of Parliament were thus given a visible proof of the port's need for more facilities. After viewing at length the unloading of lake vessels and railway cars into the elevators, the loading of grain into ocean steamers and in some cases the trans-shipment by floating elevators of grain direct from lake carriers into ocean vessels, the inspection of the port was concluded, and the party was driven to Mount Royal for a view of the city from the look-out station. About 7 o'clock in the evening they arrived at the Ritz Carlton Hotel where they were entertained at dinner by the commissioners with Dr. McDougald presiding. Brief speeches were made by several of the visitors in which they all said they had been amazed by seeing the scope of the port's activities. They realized, they said, that the port was one of Canada's greatest assets.

The members of Parliament in the party were: J. Binette, W. Black, J. D. F. Drummond, B. W. Fansher, W. J. Hammell, D. Kennedy, J. Pritchard, W. S. Reed, R. J. Woods, M. N. Campbell, C. C. Davies, John Evans, D. M. Johnson, A. J. Lewis, T. H. McConica, N. H. McTaggart, T. Sales, C. W. Stewart, R. Gardiner, L. W. Humphrey, L. H. Jelliff, D. F. Kellner, W. T. Lucas, T. G. McBride, H. E. Spencer, A. Speakman, D. W. Warner, L. P. Bancroft, A. L. Beaubien, T. W. Bird, J. L. Brown, Robert Forke, R. A. Hoey, W. J. Lovie, R. Milne, J. Steadman, W. J. Ward.

Mr. M. P. Fennell, general manager of the Port of Montreal, on May 31, announced a programme of extension in improvements which will be taken up at once by the Montreal Harbor Commissioners. The programme calls for the developing of the Jacques Cartier Pier, the high level shore wharves for sections 27 to 30 inclusive, and on the wharf at section 101 leased by the Imperial Oil Company. The first work to be undertaken will be that of the Jacques Cartier Pier. Improvements to this pier were commenced by the commissioners in 1919 owing to the inadequacy of the existing pier to accommodate the larger type of vessels visiting the port. It was then decided to increase the length of the pier by 250 feet. This was done and by the end of last year the addition had been brought up to the low level elevation.

Specifications for the work now to be undertaken call for the raising of the addition to high level, in order that the sheds on the old portion of the pier may be extended to cover the new addition. It is expected that the work will take two or three months to complete. During the season of 1921 over 637 feet of low level wharfage was completed, extending from that section known as 27 to section 30 below the old Montreal jail. The proposals for 1922 are to raise these low level wharves to the high level, incorporating such work as foundation for sheds which will ultimately be erected thereon.

The work which is to be undertaken for the extension of the Imperial Oil Company's wharf will provide additional berthage of 500 feet in length and 30 feet in depth at extreme low water. The lower portion of the extension will be in the form of a pier 50 feet wide, to provide 360 feet of berthage with a depth of 20 feet at low water on the inside face, for the accommodation of lake craft.

There was a general increase in shipments of grain down the Lachine Canal during the month of May, as compared with shipments during the same month last year. There is a total increase of 2 746,133 bushels of grain. All grains show an appreciable increase except oats which registered a slight decrease. The heaviest increase is in wheat. Corn also increased, also barley, rye and flax. On the other hand farm products such as eggs, butter and cheese show a decrease. There was also a falling off in the shipments of coal, this decrease being a heavy one. The total for May this year was 21,725 tons, and for May last year 116,725 tons. There were no shipments of hard coal through the canal in May, while in May, 1921, some 000 tons passed through. The number of trips during the month of May, 1922, was 822, while in May, 1921, the number was 903, which shows a decrease of 81. The total tonnage operated was 583,161, an increase of 21,945 tons. The total passengers carried were 1,649, an increase of 868, or more than fifty per cent. There was also an increase in cargo tonnage.

Omission of the use of marine glasses at night and maintaining full speed, when slackened speed would have been more prudent, were the main causes of the stranding of the steamship "Mapledawn," on April 24th, at a place near Isle aux Vaches, in the St. Lawrence River, just a few miles below Montreal, according to the finding of the Dominion Wreck Commissioner, Captain L. A. Demers. As a result of the above finding, the pilot, George Arcand, was fined one hundred dollars and Captain J. P. Dufour, the master of the "Mapledawn," was reprimanded by the court, but was exonerated from any blame for the grounding.

The investigation was held in Montreal on May 23. Its finding was announced at Ottawa on June 14th, and read as follows:

"The court having carefully weighed the evidence of the pilot, which is the only important evidence available, finds that Pilot George Arcand did not exercise proper vigilance—the omission of the use of the marine glasses being recognized by high authorities as an indifferent lookout—and maintaining a full speed, when to his mind, objects did not appear as he expected.

"Owing to the fact that the buoying of that narrow stretch had not been completed, the pilot's license will not be dealt with; but in lieu of this a fine of one hundred dollars is imposed, to be paid to the department of Marine and Fisheries, Ottawa, on or before the 30th of June 1922.

"The court exonerates the master, J. P. Dufour, from any blame for the grounding; but it looks upon his absence from the bridge, with disfavor, and therefore reprimands him.

"In view of the fact that the pilotage is non-compulsory, is it advisable for the master to retire to his room when his ship is being navigated in narrow stretches?

"In this instance, the master would not possibly have drawn the attention of the pilot as to whether the course steered was leading his ship into danger as he does not possess sufficient knowledge of the locality; but the court maintains that the presence of the master has a moral effect on those who are serving him, hence he should be on hand."

Captain Dufour at the enquiry stated that he had been on deck until 10.30 o'clock, and he had then gone to his room under the bridge and had gone to sleep. Upon being called to the bridge, he attempted to free the vessel by various movements of the engine, while tanks were being sounded and soundings taken outside. The vessel was freed at 7.00 a. m. on April 25th, with the help of three tugs.

Pilot Arcand stated that the night was clear but that there was some smoke and also that the high water had partially submerged some of the islands in the locality. The vessel grounded on a soft mud bottom with no shocks, and no damage was sustained.

In the summary the court found that the pilot whose evidence was chiefly dealt with, "did not exercise that vigilance and ordinary prudence that was expected of him. Such happenings are detrimental to many interests and to the reputation of the St. Lawrence as a waterway, upon which large sums have been, and are, expended annually by the Government to render it safe for day and night navigation, and are likely to reflect painfully on the ability of pilots not only individually, but as a body."

The Wreck Commissioner was assisted by Captains Charles Lapierre and Arthur Lefebvre, acting as nautical assessors.

On June 14th Captain L. A. Demers, Dominion Wreck Commissioner, announced his decision in the case of the grounding of the steamer "Senator Derbyshire," in April last. Pilot Severs Perron was fined fifty dollars, the minimum penalty, and Captain J. B. Gamache was reprimanded for being away from his post. The investigation was held on June 6th, Captain Demers being assisted by Captains C. Lapierre and Arthur Lefebvre who acted as nautical assessors.

Current News of The Ancient Colony

Special to "Canadian Shipping"

"Euchred God Almighty's Death, Bluffed the Eternal Sea."

THE carrying of the "Bolivar" across the Bay of Biscay safely to port of destination, written of in the powerful language of Kipling, from which the above couplet is taken, had nothing on the wonderful feat of towing performed by the Leyland liner "Winifredian" when by magnificent seamanship and pluck, in the face of the gravest and greatest danger of the grey Atlantic in April last, she safely towed a sister ship, the "Oxonian" to the shelter of port, after one of the most strenuous and difficult pulls perhaps ever recorded in the archives of those that go down to the sea in ships. The story of the tow is an epic of the ocean. Difficulties occurred, only to be surmounted and conquered. Parting tow hawsers, huge seas, fog, snow, tempest; all these elemental forces of Nature were in union against the tower and the towed, but skill triumphed and without any loss of life or extra damage to either ship, both made port, and Masters, Officers and men heaved a sigh of relief when the anchors of the ships plunged into the water of St. John's harbor. Battered and buffeted they were victorious in a battle with death.

The Two Ships

S. S. "Winifredian," which left Boston on Saturday, April 13th for Liverpool, is a ship of considerably over 9,000 tons of gross register, with accommodation for 250 passengers, 65 being on board on the eventful voyage now described. In addition to her regular crew of 130 of all ratings, there were 31 cattlemen, who were looking after 850 head being shipped by Armours and Morris of Chicago. The "Oxonian" is a freighter of 6,000 tons burthen and was bound from Portland to Liverpool at the time of the accident, carrying a large cargo and 750 head of cattle. This vessel was formerly a Furness liner. Both ships attracted much attention during their stay in St. John's and were visited by many people.

Rudder Shaft Broke

After leaving Portland on April 13, the same day as Winifredian left Boston the Oxonian experienced fine weather and all on board expected to reach Liverpool in good time. On Wednesday, April 19, shortly after noon, it was discovered that the ship was not answering her helm. An examination showed that the rudder shaft had been broken off in the trunk, and repairs being impossible, a wireless call for assistance was sent out. The weather, fortunately was moderate, and within quick time an answer came from the Winifredian, which was in close proximity to her sister ship. The position of the Oxonian was then, approximately, 460 miles south of Cape Race. Within a few hours the big liner came up with the freighter, and St. John's being the nearest port, the masters decided that tow should be made to there. Hawsers were quickly connected between the two ships, and the eventful and difficult tow began.

As Told By a Passenger

Mr. D. Thomas Curtin, former war correspondent, present Boston correspondent for the Daily Mail, London, who was a passenger on the Winifredian, tells the following story: "The Winifredian left Boston on Saturday, April 13th for Liverpool. On the following Wednesday, when in North latitude 39.30, West longitude 46, a radio message was picked up from S. S. Oxonian, telling that her rudder was broken and asking for assistance. All speed was made to the position given by the Oxonian, and at midnight the disabled ship was picked up, 150 miles North East of the position given when the S. O. S. call was sent out and received by the Winifredian, the position of the latter being referred to. Coming within hail, Capt. Parry of the freighter asked for a tow to port as his ship was helpless and unmanageable. The first thing done was the transfer of one of the Marconi operators from the Winifredian to assist the wireless man on the Oxonian, and this was accomplished in a most skilful manner. A towing hawser was then passed and made fast, and the ships began their trying run to St. John's, then 460 miles distant. The tow was a heavy one, the engines of the Oxonian being stopped, although steam was kept on the boilers in case of an emergency. Thus a terrific strain was put on the liner, the tow being a dead drag astern, and naturally speed was low.

Fog Adds to Difficulties

To increase the trials and difficulties of the towing ship, a thick fog set in shortly after way was made, which enveloped everything, while a head wind, with a choppy sea, sprang up, thus adding to the danger. A continuous stream of wireless messages were kept passing between the two ships, this being the only means of communication, and it is estimated that 15,000 words were exchanged from the time the tow commenced till port was reached. As can be imagined slow progress was made. After three days' towing a fresh difficulty arose. Cattle feed began to run short on both ships. Not expecting a long voyage, the cattlemen had taken only a limited supply, and were therefore unprepared to deal with the emergency. However it was finally decided to ration the animals. All this time the tow was slowly but surely making progress, the officers of both being constantly on the alert. Eventually they arrived off the Narrows, by which name the entrance to St. John's harbor is known to all mariners, land being made on Tuesday, 25th. Unfortunately for prospects of making port, a dense fog was encountered, and with a choppy and short sea running on the shore, the heavy freighter became almost unmanageable, swinging about in a manner that caused considerable alarm to those on board both vessels.

Saved by Presence of Mind

About 4 o'clock on the morning of the 26th, more than an hour before daylight the passengers on board the Winifredian were awakened by a tremendous vibration, and hurriedly dressing themselves and gaining the deck, they beheld the tow drifting to what seemed certain doom on the breakers. The terrific strain on the towing cables was more than they could stand, and one by one parted like pack thread, and with the wind blowing on the land the ship seemed to be fast drifting to inevitable destruction, those on board the Winifredian being powerless to render any aid. Providence, however, sometimes intervenes when human power fails, and just in the nick of time the wind suddenly veered off shore, swinging the Oxonian's head away from the dangerous quarter toward which she had been heading, and pointing toward the open sea. The forethought which had ordered steam kept on the boilers was now apparent, for taking advantage of the swift change in the wind, and with great presence of mind, Capt. Parry ordered the engines "full ahead." The thrust of the propeller quickly carried the ship away from the menace of the granite foreland, and a sigh of relief went up when it was seen that the danger had been cleared.

A Feat of Seamanship

Immediately the tow was once more in a seaway, Captain Trant of the Winifredian set about the task of getting another towline connected up. To place it on board the drifting ship required almost super-human skill, but undaunted by the dangerous and highly risky task, the gallant captain splendidly manoeuvred his big ship alongside the helpless tramp, having to steam ten miles off to come up with her, and placing the stern of the Winifredian perilously near the bows of the drifting Oxonian, a heaving line was thrown

from the former, caught by those on the forecastle deck of the latter, and from this beginning the new line was taken on board and made fast, eleven hours having been occupied at the job. Captain Trant's skilful seamanship earned the praise of all who witnessed it, for it was deemed to be impossible to get near enough to the tramp to pass even a hand line from the bigger ship.

Tugs to the Rescue

Meanwhile signals for tugs had been made, and very promptly four of these very necessary little crafts answered the call. Saturday morning, April 29th, these managed to get alongside, and with two ahead and two astern the Narrows were safely navigated and at 8 o'clock in the evening, the haven was reached to the infinite joy and delight of weather beaten and tired mariners. Mention must be made of the bravery of the tugs' crews, who spared no effort in their labor of assistance. Particular mention must be made of the master of the "Cabot," who succeeded in placing a pilot on board each of the ships, in the face of difficulties that would make the most heroic quail. Notwithstanding the extremely violent movements of the Oxonian, during the time she was in tow, but few of the cattle on board suffered injury. Thus terminated, with safety to all, one of the most remarkable tows in the annals of the Merchant Marine.

Capt. Parry of the Oxonian

The master of the Oxonian is one of the oldest and most experienced skippers to visit St. John's for many years. He has followed the sea for over fifty years, thirty-one of which he has been in command, and has had a varied and interesting career. He holds many decorations, including the Royal Humane Society's medal for saving life at sea, and was awarded the O. B. E. for services rendered during the war, when as commander of the Leyland liner "Georgian" he performed exceptional services in the Dardanelles, particularly at the evacution of that blighted spot. The "Georgian" was ultimately torpedoed in the Aegean Sea, with a loss of 37 lives out of five hundred carried. Captain Parry went down with his ship, but being a mighty swimmer escaped the vortex and managed to reach a collapsible boat floating nearby. Captain A. W. V. Trant of the Winifredian is also the holder of the O. B. E. While in port both these gallant mariners were entertained in a manner befitting their positions and long service. While we have such men as these the old "Red Duster" will ever float triumphantly over the waters of the Seven Seas.

Coastal Boats and Engineers

The Coastal steamers have now all gone into service for the summer and the Engineers who were having a holiday for the past few months have again taken up their duties. The option on the sealing wages (see article in April issue) was finalised without any hitch, and it is obvious that both parties were thoroughly satisfied. It is to be noted that a small reduction of wages for present service went into effect on May 1st, by agreement, and continues until May 1st, 1923, when another agreement may be made, if deemed feasible and conditions warrant. The new scale is 12½ per cent. less than the rates paid last year.

Loss of the Arbeeco

On May 10th last, S. S. "Arbeeco," fourteen days out from Liverpool to Quebec, ran ashore on Renews Rock, off Renews Head, Ferryland District, in a fog, and became a total wreck. The ship was in ballast, and was crossing the Atlantic to her new owners, the Kirkwood Steamship Company of Quebec, having been purchased from the original owners, the Arbeeco Shipping Company of London. Captain Cameron who was in command was trying to pick up Cape Race when the accident occurred. The crew landed safely, and after considerable hardship reached Cappahayden, scene of the wreck of S. S. Florizel in February, 1918, and thence to St. John's from where they were sent home. The Arbeeco was built in 1894 at Ayr, Scotland; was 745 tons gross, 396 net.

U. S. SHIPPING BOARD

The Emergency Fleet Corporation has just entered into a contract with the Texas Company for the movement of between 500,000 and 1,000,000,000 cases of oil to East and South African ports. This movement will be based on monthly shipments and extend over a period of a year.

The Emergency Fleet Corporation's service to East and South African ports was recently established under the Managing Agency of the Mallory Transport Lines, Inc.

The first sailing will be the S. S. Eastern Glade, June 24, to be followed by the S. S. Eastern Crown, the latter part of July. Monthly sailings will be maintained thereafter and this contract will give the Mallory Transport Lines, Inc., a nucleus of cargo for each ship, thereby assuring shippers of regular sailings of American flag steamers in this trade.

A conference was held recently, at the Munson Line offices, New York, between Sir Robert Cook and David Cook, of the Lamport and Holt Line, Frank Munson, of the Munson Steamship Line, and W. B. Keene, traffic manager of the United States Shipping Board Emergency Fleet Corporation.

The general question of passenger service and rates between New York and Brazil and the Plate River was discussed, with the view to reaching a mutually satisfactory understanding.

No definite conclusions were reached, the matter being left open for further consideration by both interests. In the meantime, there will be no change in the rates now prevailing.

Sir Robert Cook will leave to-morrow for England on the new Lamport and Holt steamship Van Dyke.

The Board of Engineers for Rivers and Harbors, War Department, in cooperation with the Bureau of Research of the United States Shipping Board, have just issued Port Series No. 2, devoted to Boston, Mass. The complete series as proposed will comprise 71 reports on the principal ports of the United States, prepared to meet the needs of the War Department in its development of harbors and its encouragement of port facilities, of the Shipping Board in its promotion of an American Merchant Marine, and of commercial and shipping interests in the upbuilding of their business.

In issuing the second of the series, the port of Portland, Me., being the first, the compilors state in the introduction that under the Shipping Act and the Merchant Marine Act of 1920, "the War Department is required by law to assist the various ports in the design and construction of modern port terminals of such character as to handle the particular business of the port in the most expeditious, and therefore in the most economical manner. The United States Shipping Board in its encouragement of an American-owned Merchant Marine can afford to overlook no detail which will contibute to the economy of ship operation and the curtailment of the time spent by vessels in port is an important item in shipping economics. Before they can properly function in the encouragement of ports and ships, both the War Department and the Shipping Board must have the facts without which the shipping business can not be successfully conducted, nor the port terminal correctly planned and economically operated."

The report includes chapters on port and harbor conditions, port customs and regulations, port services and charges, fuel and supplies, port and harbor facilities, communications, the freight rate situation, the commerce of Boston, and the territory tributary to that city. Of special interest are the tables and maps showing the origin and destination of imports and exports through the port.

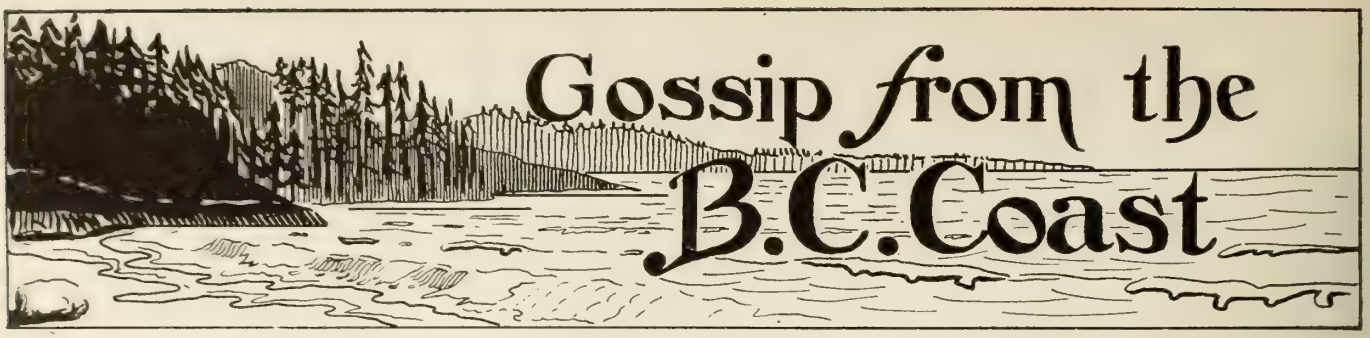
C. G. M. M. Appointments

G. V. Brown to be Chief Engineer of S. S. "Canadian Volunteer."

J. A. Prysz to be Chief Engineer of S. S. "Canadian Planter."

P. C. Bennett to be Chief Engineer of S. S. "Canadian Rancher."

J. Still to be Chief Engineer of S. S. "Canadian Ranger."



CUT-THROAT competition between trans-Pacific lines will soon be at an end if present conditions are to be taken as a reliable indication of a definite and more or less permanent movement. The two leading Japanese shipping concerns, the Osaka Shoshen Kaisha and the Nippon Yusen Kaisha, are showing a tendency to co-operate with each other to a greater extent than ever before. This has been brought about by widespread depression in Japanese shipping and the recognition among the principal operators that if Japanese interests are to obtain a substantial share of the trade offering they must pull together, rather than fight each other for it. As a result of this, it is said that the Canadian Pacific Steamships, Ltd., and the Admiral Line, the leading Canadian and American lines respectively in the trans-Pacific service, are considering plans for another conference at which a uniform rate can be arrived at. Reports from the Far East state that competition between the conference lines and the Osaka Shoshen Kaisha in the Calcutta run has become so keen that the Nippon Yusen Kaisha is likely to take the initiative in getting all operating companies to agree on a fixed schedule of rates. The Formosa service, which is entirely in Japanese hands, is now an entirely co-operative affair to the extent that the Nippon and Osaka concerns and the Mitsui Bussan, and Yamashita Kisen Kaisha are all operating on the same rates.

Trans-Pacific freight business is still experiencing a pronounced depression and many of the Japanese lines are diverting their carriers to other routes. Most of the tramp steamer operators have also transferred their tonnage elsewhere, as the business offering has not been sufficient to warrant sailings at current rates. The Japanese demand for lumber, which was the salvation of the British Columbia industry last year, has virtually collapsed, and while predictions are made in reliable quarters that there will be a revival in the fall, coupled with a firming of prices the situation in the meantime is anything but satisfactory to ship operators as well as to exporters.

Japan's lumber demand has continued to decline this summer in spite of the fact that trans-Pacific freight rates are lower now than at any period since the war. Apparently Japannese buyers "bit off more than they could swallow," and the result has been a serious congestion of lumber stocks in Japan. Until the liquidation process has been completed no substantial change in the situation is anticipated. The average rate on lumber now is $10 a thousand feet, but a few shipments have been made at approximately $8, and there isn't much money in ocean transport at that figure. The Portland conference more than a month ago fixed a definite rate schedule, $11.50 for lumber and so-called "baby squares" (timber for Japan), $12.50 for large squares and $17.50 for logs, but the conference had no tangible result as the bigger operators refused to regard the new standard. Lumber has been the principal commodity shipped to the Far East for a considerable period now, and there has been little freight coming to this cost from Asiatic countries. What does come from that quarter is usually handled by the established lines, and that is one of the reasons why the tramps found the trans-Pacific route an unprofitable one.

So far as the lumber business is concerned, there is more interest in sailing ships than formerly and inquiry for that class of tonnage during the last week or so has been fairly active. Several sailors have recently been booked for cargoes destined to South America at around $22 a thousand.

Although the Federal Government has definitely announced that construction of the drydock at Esquimalt would be resumed, work is still being held up pending the passage of a sufficient amount to cover cost in the supplementary estimates. H. W. M. Scott, manager for the Peter Lyall Company, contractors for the drydock, is still in the east, and the job is at present under the control of D. F. DeBreigny.

Vancouver interests are still working hard for resumption of drydock negotiations in their port, and strongly object to the Government's attitude in suspending the work which was to have been proceeded with under the terms of the Dockyard Subsidy Act. The Vancouver firm of J. Coughlan & Sons agreed to build the dock under this legislation, so that the Government's funds would be guaranteed, but evidently the Government has taken the stand that the Esquimalt drydock would have to be finished on account of the heavy expenditures already made on it and that it would be an economic blunder to establish two large drydocks on the Pacific Coast at such close proximity to each other.

Count Zanerdi Landi, who is at the head of the expedition seeking to salvage the treasure from the hold of the Lusitania off the Irish Coast, formerly took an active part in engineering work in British Columbia. The count, who is now the head of the Rycready Salvage and Towing Company, was in Prince Rupert in 1906, laying out the townsite, and for four years he was engaged under J. H. Pillsbury, who later became head of the Prince Rupert Drydock & Construction Company. During the war Count Landi was in Paris and organized a syndicate which undertook several successful salvage operations.

The Royal Mail Steam Packet Line will shortly send four new steamships to the Pacific route, according to Colonel E. J. N. Nash, Pacific coast manager, who has returned from a trip to New York head offices. The steamships Ohio, Orga, Loch Goil and the Dreekdijk will figure in the new schedules. Their tonnage ranges between 16,000 and 19,000. They are expected to reach here next fall and winter. Two additional vessels will be placed in operation during the apple season to accommodate shipments from British Columbia to the United Kingdom. The landing of lots of 150,000 boxes at a time last year had a bad effect on the market, and a more continuous flow has been sought by the shippers, with a result that the steamship company granted additional concessions.

The steam schooner Iskum, formerly a cannery tender for the Clayoquot Canning Company, of Victoria, and prior to that engaged in the sealing trade, left Victoria a few days ago for Behring Sea and the Siberian Sea. Her ultimate destination is the Kolima River, where trading in furs and ivory will be undertaken. The Iskum is being operated by the Phoenix Northern Trading Company, of Tacoma, Wash., and is manned by several prominent Tacoma businessmen who have been fascinated by the stories of hidden wealth in the northland in the form of furs and mastodon tusks. Capt. A. W. Wennerlund, of Seattle, is skipper of the Iskum. He is a veteran in the northern service, although it is more than fifteen years since he was further north than Alaska.

Capt. W. H. Logan, of Victoria, of the London Salvage Association, and for many years Lloyd's surveyor at that port, is in charge of salvage operations in connection with the British steamship Welsh Prince, now stranded in the Columbia River near Altoona. A deckload of Japanese squares is regarded as the principal freight and this will be the objective of the salvage crew.

The Canadian Pacific Steamships, Ltd., has again inaugurated its "Round-the-Pacific" tours and is now booking passengers from British Columbia ports to the Orient, thence to Australia and back again to British Columbia by way of the Hawaiian Islands. Although Canadian Pacific steamships carry the trade across the Pacific, the Eastern and Australian Line will operate between Hongkong and Australia, including stops at Sandakam, North British Borneo; Thursday Island; Townsville, Brisbane, Queensland; Sydney, New South Wales. The Canadian-Australian Line will take the passengers from Australia to Victoria and Vancouver. The tickets for the tour are good for twelve months, allowing stop-overs as desired.

The Canadian Pacific liner Empress of Japan, which is to be withdrawn from the Pacific to make way for newer and larger ships, returns to Victoria July 19 on her last trans-Pacific voyage, when she will have completed her 158th run in the British Columbia-Far East service. The advent of the Empress of Canada and Empress of Autralia, 22,000 tons and 21,500 tons respectively, has resulted in the withdrawal of the Empress of Japan and the Monteagle. The Monteagle has made ninety-two trans-Pacific voyages and consumed 395,000 tons of coal.

The fleet of the Consolidated Whaling Company, of Victoria, is again off the Vancouver Island coast this season after a year's suspension of activity, and the first catch was reported a few days ago. The market for whale products has shown an improvement this year sufficient to warrant operations, and a fairly good year is anticipated.

Dr. H. Rundle Nelson, for nine years superintendent of the Dominion quarantine station at William Head, near Victoria, has retired and will resume his private practice. Dr. Chester Brown will succeed him. Dr. Brown was formerly assistant at William Head and went overseas with the Canadian Medical Corps. On his return to Canada he was in charge of the Island quarantine station off St. John, N. B., for about two years.

The Colby Steel & Engineering Company of Vancouver, has been awarded the contract of building a hammer-head electrically operated steel travelling crane for the Esquimalt drydock, the cost being approximately $40,000.

In spite of the prevailing shipping depression, the Nippon Yusen Kaisha, Japan's largest ship corporation, has been able to pay a 15 per cent. dividend. President Y. Ito reported at the annual meeting recently that the profits for the year had amounted to $1,300,000 and that the company was in a strong position to meet present conditions. The company now has reserve funds equal to 150 per cent. of the paid up capital, and the inventory value of the company's floating equipment is at the comparatively low figure of 120 yen, or about $60, a gross ton.

Word is expected at an early date concerning the Pacific Cable Board's intentions with regard to duplication of the Pacific cable. John Milward, one of the board's experts, is now in London conferring with the directors after making a thorough investigation of the situation in the southern Pacific. It is expected that the project, if carried out as recommended by Mr. Milward, will cost about $10,000,000 and require two years to complete.

The Admiral Line steamship H. F. Alexander, formerly the steamship Great Northern, is now in the Pacific and will shortly enter the service between British Columbia and Puget Sound ports and California. The H. F. Alexander is a sister ship to the Northern Pacific, which was also purchased by the Admiral Line and was burnt at sea off the Atlantic coast a few months ago.

MERCHANDISE

By Milton Hayes

(The following poem, which has been recited on the stage in London, has achieved a great popularity, and given considerable to the gentleman who delivers the recitation. It is a purely commercial subject treated in a somewhat unusual way, and should commend itself to those earnest workers for a Canadian merchant fleet, the Navy League of Canada.)

Merchandise! Merchandise! Tortoise-shell, spices,
Carpets and indigo—sent o'er the high seas;
Mother-o'-Pearl from the Solomon Isles—
Brought by a brigantine ten thousand miles.
Rubber from Zanzibar, tea from Nang-Po,
Copra from Hayti, and wine from Bordeaux;
Ships, with top-gallants and royals unfurled,
Are bringing in freights from the ends of the world.

Crazy old wind-jammers, manned by Malays,
With rat-ridden bulkheads and creaking old stays,
Reeking of bilge and of paint and of pitch—
That's how your fat city merchant grew rich;
But with tramps, heavy laden, and liners untold
You may lease a new life to a world that's grown old.
Merchandise! Merchandise! Nations are made
By their men and their ships and their overseas trade.

So widen your harbors, your docks and your quays,
And hazard your wares on the wide ocean ways,
Run out your railways and hew out your coal,
For only by trade can a country keep whole.
Feed up your furnaces, fashion your steel,
Stick to your bargains and pay on the deal;
Rich is your birthright, and well you'll be paid
If you keep in good faith with your overseas trade.

Learn up geography—work out your sums,
Build up your commerce, and pull down your slums;
Sail on a Plimsoll that marks a full hold;
Your overseas trade means a harvest of gold,
Bring in the palm oil and pepper you've brought,
But send out ten times the amount you import;
Trade your inventions, your labor and sweat;
Your overseas traffic will keep ye from debt.

Hark to the song of the shuttle and loom,
"Keep up your commerce or crawl to your tomb!"
Study new methods and open new lines,
Quicken your factories, foundries and mines;
Think of Columbus, De Gama and Howe,
And waste not their labors by slacking it now;
Work is life's currency—earn what you're worth,
And send out your ships to the ends of the earth.

For deep-bosomed mothers with wide-fashioned hips
Will bear ye good sons for the building of ships;
Good sons for your ships and good ships for your trade—
That's how the peace of the world will be made!

So send out your strong to the forests untrod,
Work for yourselves and your neighbors and God;
Keep these great nations the homes of the free,
With merchandise, men and good ships on the sea.
Merchandise! Merchandise! Good, honest merchandise!
Merchandise, men and good ships on the sea.

Halifax Notes

THE present summer season promises to be the quietest the Port of Halifax has had for the past fifty years. With the opening of navigation on the St. Lawrence all ocean going traffic, which had been coming to this port during the winter months, was diverted up the river, so that at present the Halifax water front is practically dead.

During the past month the shipment of deals to the New York market has picked up considerably, and a few cargoes of lumber have also been sent across the Atlantic to the United Kingdom and to the West Indies. Lumber is now practically the only export that is being handled in large quantities at Halifax. Small shipments of refined sugar are being made to the United Kingdom.

At present there is only one regular trans-Atlantic passenger and freight service from Halifax, that being the Liverpool-St. Johns-Halifax-Boston service carried on all the year by Furness Withy and Company. The other ocean going services from Halifax are those to the West Indies, Newfoundland and Boston and New York, which are operated all the year round.

Shipping men, who have had years of experience, stated that the present is the slackest times they have ever seen in Halifax, and there is little hope of any improvement before next fall.

The spring mackerel run along the southern Nova Scotian coast is over and the season was a most successful one. Catches by seiners and by shore fishermen secured more mackerel this year than for many years. The fish taken were quite large and at the first of the season brought a good price, but as the supply began to exceed the demand the price dropped.

This year the shore fishermen did better than the seiners, as the fish seemed inclined to hug the shore and schools were taken within a few hundred yards of shore. Some of the schools were so large that the seines could not hold them. The largest catches were taken near Prospect and Dover, within twenty miles to the westward of Halifax. The bulk of the mackerel taken were rushed to the American markets.

On May 31 the Yarmouth-Boston steamer arrived at the latter port with 2,960 barrels of mackerel, which was the largest shipment of fresh mackerel ever received via that route. She carried approximately a quarter of a million mackerel.

This season was the first time that a trawler has ever gone mackerel seining from a Nova Scotian port. The Lemberg, which had had a very successful year fresh fishing, was sent out more as an experiment. She secured a school of about fifteen thousand pounds. It is believed that the operation of steam propelled craft is too expensive for mackerel seining, which is so uncertain.

The Abbie Keast struck Black Rock, near Parrsboro, floated herself and went adrift in the Bay. She was towed to port, but is a total loss. She is owned by her master, Captain George Bullerwell, and his loss is heavy as there was no insurance on her.

While enroute from St. John to Halifax early this month to complete her cargo of refined sugar the Norwegian steamer Sangstad stranded on Seal Island, just west of Cape Sable, refloated herself and proceeded to Halifax. On being drydocked it was found that seventy plates had been damaged and the Halifax Shipyards secured the contract of repairing her.

The C. G. S. Aranmore, which was laid up since last fall, was commissioned this month and is now attached to the Charlottetown agency. The C. G. S. Stanley has been laid up and her officers and crew transferred to the Aranmore.

A United States squadron will visit Halifax in August and will be here for fourteen days. This squadron, which is under Rear Admiral M. A. McCully, consists of his flagship, U. S. S. Florida, U. S. S. North Dakota, U. S. S. Delaware and U. S. S. Olmypia. The first three are battleships and the latter of the cruiser type. About 1,700 midshipmen, in training at the U. S. Naval Academy at Annapolis, will be on the ships.

The Norwegian steamer Nevis and the Swedish craft Caledonia, have completed their charter on the Halifax-Santiago-Jamaica service, which is operated by Pickford and Black, of Halifax, and the Norwegian steamer Andalusia is now the ship maintaining this service.

The largest cargo ever loaded at Digby was taken by the Norwegian steamer Thomas Haaland, which sailed from that port on June 9 for the United Kingdom with 4,650 tons of wet pulp, principally from the Weymouth mills. The cargo was loaded in seven days and the experiment of shipping from that port proved a great success.

The North Atlantic Squadron, which was scheduled to visit Halifax this month, is to proceed up the St. Lawrence and may call here later in the season. H. M. S. Raleigh, Admiral Packinham's flagship, visited Sydney enroute up the river. H. M. S. Constance was in Halifax for a few days.

The small steamer, Bernard M. built at Wedgeport in 1919, and which has been used as a trawler and coastal craft, has been purchased by Captain Bernard M. Melanson, of Digby, from the United Fruit Company, which firm has been using her for a year in collecting fruit along the coast of Jamaica, and will be brought back to Nova Scotian waters.

Two Parrsboro schooners met with mishaps in the Bay of Fundy, early this month. The three masted Barbara W., bound from Apple River, N. S., to Boston, with 350,000 feet of spruce lumber, went ashore and later refloated herself and was towed into Port Greville full of water. It was found that she was not as seriously damaged as at first supposed and after temporary repairs had been made she proceeded.

The Lunenburg fishing fleet started this month on their summer trip. The majority of the fleet returned with good catches from their second spring trip. So far this season the champion Bluenose has landed about 1,700 quintals of fish.

The Halifax Lightship was taken off her station, refitted, and is now on her summer station at Anticosti Island.

£10,000 FOR RESEARCH

The name of Parsons is known all the world over in connection with the invention of the steam turbine which has made possible the cheap production of electricity in large quantities and the development of high speeds by large ships. In addition to inventing the turbine Sir Charles Parsons has rendered great service to the progress of science and the latest sign of his interest in the field is the gift of ten thousand pounds to the British Association for the Advancement of Science. Since it was founded in 1831, the Association has made grants of over eighty thousand pounds towards scientific research. Sir Charles' latest gift will enable the Association to maintain its important work of scientific investigation. In connection with the speed of ships it is interesting to note that the fastest ship afloat is a British vessel, the "Mauretania," and during a recent voyage from the United States to Great Britain she maintained an average speed of 25.14 knots, and at one stage she attained 27.5 knots. This was the fastest trans-atlantic cruise made since the war, and it is faster than the same vessel had ever attained.

LARGE DREDGE BUILT IN MONTREAL

Dredge No. 16, now completing at Canadian Vickers Limited, for the Department of Marine and Fisheries, Ottawa, left Canadian Vickers' Shipyard on the 6th instant to commence her trials, preparatory to completion and delivery to the department.

This dredge is practically a sister ship to the dredge "Corozal," which was built by Messrs. Wm. Simons & Co., Ltd., of

Renfrew, Scotland, and was used in the construction of the Panama Canal.

Dredge No. 16 is one of the largest bucket ladder dredges in the world, being 292 feet overall in length, breadth 48 feet moulded, and depth 20 feet 6 inches moulded, and having two sets of buckets, one set with a capacity of 54 cubic feet to each bucket, and the other of 30 cubic feet to each bucket, the former for dredging soft, and the latter for hard material.

The vessel is propelled by twin screws driven by reciprocating engines, developing a total horse-power of about 1,400, by means of steam generated in two Scotch boilers.

The vessel is electrically lighted from her own dynamos, and is completely equipped with all the auxiliary machinery necessary for the working of such a large piece of machinery. For instance, she has a 5-ton steam crane on deck for assistance in handling the buckets, and the bow and stern winches are of an elaborate and complete nature for the handling of the fore and aft moorings, as well as the breast moorings, and ship's anchors.

The dredge can deliver 1,500 tons of soil per hour either into scows or hopper barges alongside, or into her own hoppers, and she is capable of dredging her own way through soil at a depth of 57 feet.

The construction of the vessel was commenced in 1914, but abandoned owing to the war, a start being again made on this work last year, when the vessel was brought back from Sorel, where she laid since 1917 in a half completed condition.

The designs for this vessel were prepared by Messrs. Wm. Simons & Co., Limited, of Renfrew, Scotland and owing to the Vickers' plant at Montreal not having been completed at the time this contract was entered into, the dredging machinery and buckets were constructed by Messrs. Simons & Company, and shipped out to Montreal. The boilers were constructed by Messrs. John Inglis & Co., Limited, Toronto, Ont.

It is understood the vessel is intended for use in the ship canal below Quebec, and that she will be ready to go into service about the end of June.

THE PRICE OF SHIPS

The following information was given in a statement recently made by H. M. Trade Commissioner in Toronto:—

While presiding at a general meeting of the Isles Steam Shipping Company, Sir Arthur Sutherland gave some interesting figures in regard to the past and present cost of shipbuilding. He stated that in 1908 a tramp cargo steamer of 7,500 tons cost about £36,000. In 1914 the value of a ship of that description was £42,500, and in 1920 at the top of the market the value of the same sort of ship was about £259,000. To-day the value is £60,000, and to build a ship of that kind would cost about £90,000.

Despite unfavorable conditions, however, a certain amount of new tonnage has been turned out and ship-builders in general display the greatest keenness in any opportunities which are brought to their notice.

During the present lull considerable attention has been directed towards new developments in the motor ship. It is claimed that the fuel bill, at prevailing prices, of this type of vessel is approximately fifty per cent. less than that of the steamer, and that notwithstanding variations in prices of coal and oil this difference is maintained owing to the economic relationship between these two commodities.

Sir Arthur Sutherland stated that it was thought that there was a great future for motor ships. The motor ship instead of burning about 40 tons of coal a day would burn only about 7 or 8 tons of oil. There were considerably reduced costs in running such vessels; they required fewer men than the steamer; carried oil for fuel purposes in the ship's tanks, and thus had proportionately larger space for cargo.

The "Loch Katrine," which sailed on February 14th from London on her maiden voyage, is the first motor ship to be built for the Royal Main Steam Packet Co. She has been specially constructed for the new London-Antwerp-Rotterdam and west coast of North America service, and has been provided with 100,000 cubic feet of refrigerated cargo space in one of her holds. Her principal dimensions are: length over all, 502 ft.; beam 62 ft.; and depth 38 ft. 6 ins.; while her gross tonnage is 9,500 and her dead weight tonnage 14,000. The vessel was built by John Brown and Company, but was designed by Harland and Wolff, who also supplied all the machinery. Her propelling engines are 8 cylinder, 3,200 I. H. P. Harland and Wolff type, and her speed is approximately 12½ knots.

Purchase and Sale of Ships

Instances occur from time to time where foreign firms lose money when purchasing or selling vessels in the United Kingdom, because, owing to their omission to make enquiries, their interests have not been placed in proper hands.

It is, therefore, suggested that foreign firms desiring to buy or sell vessels in the United Kingdom should communicate, through the nearest British representative, with the Department of Overseas Trade, which is in touch with the Institute of Chartered Shipbrokers and with the leading Purchase and Sale Brokers, and is in a position to suggest the names of suitable intermediaries.

HUGE DOCKS FOR SOUTHAMPTON

With each increase in the size of liners, the dock accommodation at Southampton, England, has been extended, or rather it should be stated that the development at Southampton docks has always been in advance of the actual necessities. A scheme is now on foot for the construction of new docks which will accommodate not only the biggest boats now afloat but as many more of the largest possible size as are likely to be constructed within the next ten years or so. A series of oblique jetties is contemplated, and the scheme also includes the construction of new graving docks larger than anything at present available. These graving docks will enable repair work to be carried out on the largest liners; and their facilities are to be supplemented by a huge floating dock. Important developments are also on foot in connection with the Liverpool docks. Work is already in an advanced stage in connection with graving docks and with an enlarged entrance to the new dock system, enabling the largest liners to go in and out of dock no matter what the state of the tide may be. The magnitude of this new work may be gathered from the fact that at least two more years will be occupied in completing it.

AUTOMATIC STOKERS ON BOARD SHIP

It is a curious fact that, while machinery has been very generally adopted in boiler houses on land, the boiler rooms on board ship are still generally given over to hand operation. Those who have some knowledge of the stoker's life below decks will wonder that the demand for machinery in place of human flesh was not heard insistently many years ago. The oil-firing of boilers, which has been very vigorously developed for a long time by British engineering firms, effects a vast improvement on conditions; but there will remain for a long time many vessels with coal-fed boilers. Where the boiler is of the water-tube type, it is possible to find room for machinery to feed the coal into the furnace and to remove the ashes and clinkers. A recent installation put in a vessel of twelve hundred tons by a British firm proves that there are no insuperable obstacles to the application of automatic stoking on board ship. With this type of stoker the rolling of the vessel does not introduce any material trouble, but in any event the furnace may in emergency be fired by hand, so that there is no danger of steam raising being interrupted by any eccentricity on the part of the machine under exceptionally arduous conditions.

Sault Ste. Marie.—The steamer Valcartier, which arrived in the Soo on the night of April 23rd, reported having passed a large quantity of wreckage about 25 miles southeast of Michipocoten Island, but the identity of the wreckage could not be established owing to weather conditions. Fears are entertained for the safety of the Canadian, which was abandoned by her crew and left to drift with the ice.

The New Cunard Liner "Berengaria"

THE CUNARDER Berengaria (ex-Imperator) has taken up service on the Southampton-Cherbourg-New York route after her recent overhaul.

Re-conditioning and conversion to burn oil fuel necessitated a visit of some six months at the Walker yard of Messrs. Sir W. G. Armstrong, Whitworth, & Co., Ltd. The conversion completes the trio of oil-burning Cunarders which are to form the fastest ocean-going passenger service in the world, the other two being the Aquitania and the Mauretania.

The Berengaria's previous best passage from Cherbourg to New York is stated to have been made in 5 days, 22 hours, 48 minutes, and with the fine results achieved by the Aquitania and the Mauretania subsequent to their conversion to oil-fuel burning it is not too much to anticipate that the speed performances of the Berengaria will be improved upon also.

Though the fine lines of the Aquitania are not quite so evident, she still forms a beautiful model of a vessel and can be described as built more for comfort than for speed, as the following dimensions will show:—

Length	919 ft.
Beam	98 "
Depth	62 "
Depth from boat deck	100 "
Height of masts from keel	246 "
Tonnage	52,000 tons
Displacement	70,000 "

The boat deck is over 100 ft. and the trucks of the masts 250 ft. above the keel.

In addition to the conversion of the ship to oil-fuel burning during her six months' period of lying up on the Tyne, a complete renovation of the passenger accommodation has taken place. Certain new rooms have been installed, certain old rooms have been extended and the accommodation has been thoroughly overhauled and cleaned. Where necessary new furniture has been provided.

It is no exaggeration to say, therefore, that the ship is to-day a finer ship than ever before. Her passenger accommodation has been improved to practically the limits of attainable perfection, whilst as has already been noted, her speed will without a doubt show notable improvement.

It is hardly necessary to give any lengthy description of the public rooms of the ship, and, as a matter of fact, it is very difficult to convey by words a correct impression of the size and magnificence of the Berengaria's public rooms. The old saying that they must be seen to be appreciated is very applicable in this case. For reference purposes, however, a brief description is appended of some of the most important first-class rooms.

The domed two-tiered dining saloon is probably the largest of any ship afloat, extending across the whole width of the ship, and has a length of 100 ft. This vast apartment will seat 700 persons. The dome attains a height of nearly 30 ft. The room is furnished with small tables, at which parties of friends can take their meals in the comparative privacy of their own acquaintances. The predominant colour in the interior furnishings is of warm red, which harmonises delightfully with the tapestry covered walls and the dark hue of the carpet. A charmingly wrought-iron balustrade surrounds the well of the saloon.

Possibly the most striking room on the ship is the lounge. Nearly 20 ft. in height, with a length of 73½ ft. and a breadth of 55½ ft., it has been constructed without any supporting pillars at all. This gives the room an air of unusual spaciousness, and claim may safely be made that there is not a more beautiful room of a similar nature either afloat or ashore. The ceiling is painted in the style of Louis XIV., and there is also a parquet floor, which is, of course, usually covered with a heavy pile cloth. Costly gobelin antique tapestry covers the walls, and there are imposing bow windows, 14 ft. in height, on either side of the room.

In the Berengaria's saloon accommodation there are no staterooms with berths, all have instead bedsteads. These bedsteads are not narrow bunk-like constructions, but lengthy and broad English beds. The rest of the furnishing of the staterooms is upon similar lines. There is no such thing as a folding washstand; in its place one finds a large marble washstand with running water. In some of the larger rooms are, in addition, a large wardrobe, a writing table, chest of drawers, dressing table, settee, and a chair. Over and above all this there is plenty of room to move.

Saloon passengers have the use of two large covered promenade decks and also the open promenade on the boat deck. The upper promenade deck is enclosed not only in front but also along two-thirds of the length of each side by heavy plate-glass windows that shelter the passengers from the wind. This deck is 10 ft. in height, and has a width varying from 16 to 23 ft. Only half the ship's lifeboats are carried on the main boat deck, and this naturally affords infinitely more promenading space. This promenade space, of course, extends all round the ship, and that on one deck is some 660 yards long. It is in fact a seaside promenade with this difference, that in order to enjoy it, it is not necessary to go out of one's hotel.

There are on the Berengaria about half-a-dozen different kitchens. These are furnished with the latest and most up-to-date culinary appliances, most of the cooking being done by electricity. Everything is provided that will save labour and avoid the handling either of food or of culinary utensils.

The passenger accommodation consists of:—Saloon, smoking room, gymnasium, ladies' room, writing room, lounge, ball room, palm court, verandah, cafe, swimming bath, Turkish bath, dining saloon.

Second Class.—Smoking room, writing room, social hall, lounge, verandah cafe, dining saloon.

Third Class.—Dining saloons, social room, smoking room.

The chief feature of interest, however, lies in the conversion of the vessel to oil burning and deserves more than passing mention. The work of converting the vessel was an undertaking of immense intricacy and enormous proportions, and in view of the labour difficulties of the past few months, the expeditious and satisfactory manner in which it has been carried out by Messrs. Sir G. W. Armstrong, Whitworth, & Co., Ltd., who were also responsible for "converting" the Aquitania, reflects the greatest credit on all concerned.

Oil-Burning Installation.

The 46 water-tube boilers have been made suitable for burning oil fuel. The oil required for a single voyage across the Atlantic is estimated at about 6000 tons.

The system of draught to the furnaces has been altered from forced draught to the closed-stokehold system. The oil installation is a modified arrangement of "White" oil-fuel burning system to suit the closed-stokehold system of draught. All work in connection with the conversion has been made to satisfy requirements of the British Board of Trade and Lloyd's.

The oil fuel is carried in the bunkers at the sides of the ships, but not in the double-bottom tanks. Eight settling tanks, two in each boiler room, are provided. All storage tanks are fitted with heating coils to facilitate the flow of the oil through the suction pipes. Two 8-in. bore filling stations have been arranged on each side of the ship. From the filling and suction mains a 6-in. bore pipe leads to each side storage tank and each settling tank. An oil transfer pump capable of delivering 10 tons of oil per hour has been fitted in each boiler room. These pumps draw from the storage

tanks through the suction main and discharge to the settling tanks. Three pumping and heating units have been fitted in each boiler room. Under full power two units will be used for supply oil to the twelve boilers in the respective boiler rooms, the other unit being kept as a standby.

The oil-fuel pressure pumps draw from the settling tanks through the suction strainers and discharge through the heaters and filters to the burners on the boiler front. All outlets for air from the boiler rooms funnel hatches have, to suit the system of draught, been closed up so that the only outlet for the air is through the furnaces and up the funnels. All the boilers, 46 in number, have been made suitable for burning oil fuel and five burners have been fitted to each boiler. The water-tube boilers have been entirely re-tubed, and longitudinal stays have been fitted to the steam drums to comply with B.O.T. regulations. This boiler work in itself was an operation of considerable magnitude.

Main Propelling Machinery.

The main propelling machinery consists of Curtis—A.E.G.—Vulcan turbines, driving four shafts. For normal running the turbines are arranged in triple series. There are also two h.p. astern and two l.p. astern turbines.

One of the immense rotors of the turbines, containing 50,000 blades, weighs 135 tons and develops itself over 22,000 h.p. The whole of the turbines contain some 760,000 blades, which if placed end to end would stretch for a distance of 124 miles. The casing enclosing the rotors is 25 ft. long and 18 ft. wide. The shafts are 1½ ft. in diameter and the four propellers are 16 ft. in diameter.

Whilst the power of the ahead turbines is some 62,000 h.p., that of the astern turbines is 35,000 h.p.

Engine and Boiler Rooms.

The ship has four boiler rooms, each about 70 ft. in length. The turbines are arranged in three rooms, two of which are some 23 ft. long and the other about 33 ft.

Electric Installation.

The Berengaria has some 10,000 electric lights. The current is generated by five turbine dynamos and a sixth dynamo is placed above the water line for use in case of emergency. The electric supply is used not only for electric lighting, but for ventilation, passenger and store lifts, winches, electric bells, alarm signals, cooking apparatus, etc.

The Berengaria, in common with the Aquitania and Mauretania, is a ship within a ship. A double skin runs for a considerable portion of the length of the 17 watertight compartments, which are again sub-divided in the inner hull into 36 watertight compartments. These bulkheads are provided with water-tight doors which are controlled automatically from the navigating bridge.

BRITISH BUILT SHIPS FOR CANADA

The Ontario Paper Company Ltd., a subsidiary company of the New York Tribune, recently placed an order for two cargo ships with Messrs. Swan, Hunter, & Wigham Richardson, Ltd., of Wallsend-on-Tyne. These ships are to carry wood pulp from the lower reaches of the St. Lawrence River to the company's paper mills at Thorold Lake, Ontario.

One of the ships is named "Chicago Tribune," and was launched from he Wallsend Shipyard of Messrs. Swan, Hunter, & Wigham Richardson, Ltd., on the 30th May, the naming ceremony being gracefully performed by Miss Levick, daughter of T. H. Carlton Levick, Esq.

The sister ship, "New York News" was launched from the North of Ireland Shipbuilding Company's yard at Londonderry, on May 24th.

These ships, the building of which was initiated by Colonel Robert R. McCormick, one of the proprietors of those great and influential papers—The "Chicago Tribune," and the "New York News," represent an important stage in the production of these journals. The production of a newspaper having an enormous circulation depends for its success, partly at any rate, upon an adequate and steady supply of raw material in the shape of paper. By means of their own ships, the Ontario Paper Company will now transport from their own forests on the Lower St. Lawrence, Canada, the wood pulp from which the paper is manufactured in their own mills.

When one reflects upon the history of the production of the daily edition, the timber growing, the felling, the transport, the vast and complex machinery of the mills, the electrical power for which is generated by the greatest water falls in the world—Niagara—the further transport of the finished paper to the printing presses in Chicago and New York, and the concentrated human effort which must be applied daily and hourly towards the completion of that one edition which awaits us daily at our breakfast table, we feel the romance of it all, and pay tribute to the genius which controls so vast an enterprise.

In the building of these vessels, the Ontario Paper Co. has been represented on this side by Major H. Maitland Kersey, D.S.O., and the superintendence of the building of hull and machinery has been in the hands of Mr. H. M. Rogers of Messrs. Harris & Dixon Ltd., of 81 Gracechurch Street, London, E. C.

Both the vessels have been specially designed and constructed for lake service, the principal dimensions being 250 ft. between perpendiculars, 43 ft. in width, with a moulded depth of 19 ft., 4 ins., and a topgallant forecastle 39 ft., 6 ins. long. The vessels are being built to the requirements of the British Corporation.

Water ballast will be carried in the fore peak and in the double bottom fore and aft. There are six cargo hatches. Electric lighting will be installed throughout the ship, and steam heating in all living accommodation.

The engineer officers and firemen will be housed aft in a steel deckhouse on either side of the engine and boiler space. The captain, officers and seamen have quarters in the fore end of the ship, and in the forward deckhouse there will be a commodious and comfortable suite of apartments for the owner or his representative.

The engines, driving a single propeller, will be placed at the after end of the ship. They are of the triple expansion, surface condensing type. Steam will be supplied from two single-ended multi-tubular boilers working at a pressure of 180 lbs. per square inch. The machinery and boilers for the Tyne vessel are being built by the North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne, and for the Londonderry ship by Messrs. J. G. Kincaid Ltd., of Greenock.

Messrs. Swan, Hunter, & Wigham Richardson Ltd., have designed and built many vessels for the Great Lakes and canal service, and have embodied in these two ships those special requirements which, with their long experience and knowledge of this trade, have been found necessary.

BOOK REVIEW

The 1922 edition of Messrs. Seaton & Rounthwaite's Marine and Pocket Book which has just reached us, lives up to the reputation that this excellent manual has so long enjoyed. The present edition comprises 757 pages exclusive of the index, which occupies 12 pages at the back of the book. In the front is a general contents table, showing where to find the information on any particular subject, while the index at the back of the book is arranged in alphabetical order. The book touches upon practically everything that a marine engineer, be he at sea or ashore, in shop or drawing office, might be likely to require. This is a book that does not need recommending to those who know it, but to those who have not made its acquaintance, we can say that it is a book that no marine engineer should be without.

The lack of adequate coal storage in connection with the Louise Dock is a handicap to the port, and repeated efforts have been made by the Board of Trade to induce the Government to extend aid in this regard, but without success. A cold storage is also needed to take care of shipments of perishable goods going abroad, which are now gathered in the district adjoining the port, and shipped by rail to Montreal, to load in ships sailing from that port.

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Making the Seas Dry

AN AMUSING situation has arisen over the conflict of morality and expediency as exemplified by the action of the United States Shipping Board in connection with the enforcement of prohibition.

According to the United States dry law, no ship flying the American flag can carry liquor, and it is unlawful for any vessel to enter an American port if there is any of the dreadful stuff on board. The United States navy is, of course, dry, and has been for some years, and, therefore, it would seem that it would be a simple matter to make the merchant fleet just as uncomfortable. However, a strange thing happened when this course was adopted. The majority of people having occasion to leave the shores of the United States or return to them, refused to sail in ships whereon they could not satisfy their desire for the matutinal cocktail or the post-prandial aperitif. This is a sad commentary on the tastes of a large number of the population of the dryest nation on earth. Still more sad, from the point of view of the Shipping Board, was the fact that their passenger ships could not get passengers.

Under these circumstances, morality could not be allowed to interfere with commercial efficiency, so the Shipping Board closed one eye to the Volstead law, and stocked their vessels with a variety of fancy drinks. Then they beckoned the passengers to come on. They came. Now, all would no doubt have gone on smoothly, but just at this time, one Adolphus Busch, proprietor of the famous Anheuser Busch brewery, in Milwaukee, took a trip to his old home land. Being a good American citizen, he traveled in a Shipping Board vessel. To his horror, he found that although his innocent brewery was prevented from functioning, the same Government that made him strictly observe the law, deliberately violated it to suit their own convenience. Mr. Busch wrote an indignant letter to the chairman of the Shipping Board, asking him to explain the right of the board to break the law.

The gentleman thus questioned replied to the effect that the Shipping Board fleet was 100 per cent. American, that they wanted passengers, that they could not get passengers without having liquor on their ships, and that Adolphus Busch was a pro-German, and that they were going to sell liquor, so there. After which perfectly logical answer to the question of why the law was being broken, he rested his case.

As the French say, "It is to laugh."

The Great Lake Carriers

ONE OF our leading dailies, the Toronto Globe, in an editorial on the St. Lawrence Channel, speaks of the fact that some of the large freight steamers on the Great Lakes can carry half a million bushels of grain. From this the writer deduces the fact that at a rate of twelve cents a bushel from the head of the lakes to Liverpool, a freight of $60,000 could be earned. In view of this, he thinks the fact of being unable to get any return cargo would be negligible.

While not wishing to dispute the figures, we would like to point out that it would be a very handsome return if the ship and her cargo reached the other side, or, if she reached Liverpool in safety, she should succeed in negotiating the crossing of the Atlantic in ballast. We have spent many years at sea, but would hate to cross the Atlantic in a Great Lake freighter, either loaded or light.

It is perhaps rather too much to expect of a newspaper editor that he should be familiar with the differences of construction in the lake and ocean steamer. That there is such a difference is well known to those who know anything about ships.

We have pointed out before in these columns, that the bulk freight carrier in use on the lakes is a development purely of the grain and ore trade. She is of comparatively light draft, with engines and boilers placed in the extreme after end, and is invariably under-powered in comparison with a seagoing steamer of the same capacity. She is not meant to stand up against heavy weather, and, as a matter of fact, rarely attempts to do so, but makes for shelter at the first sign of an oncoming blow. The history of the lakes tells many tragic stories of those vessels unfortunate enough to be caught far from a port when the storm fiend is abroad.

The reason she can carry freight so cheaply, is that she is practically self-loading and self-trimming. Being of low power and speed, she is economical of coal. Her crew is smaller than the crew of an ocean steamer of the same capacity. In a word, she is utterly unfitted for ocean service.

Outside of these few drawbacks, the possibility of the five hundred thousand bushel steamer carrying a cargo of grain to Liverpool or Rotterdam remains remote.

MARINE NEWS FROM EVERY SOURCE

Kingston:—The steamboat inspector, at this port, Mr. Thomas P. Thompson, has sent in his resignation, owing to ill health. Mr. Thompson has filled the position he is giving up for thirty years.

Toronto:—The steamers "Joyland" and "Aragon," both of which foundered in storms on Lake Ontario, have been salved by the John E. Russell Wrecking Co., and have been brought to Toronto for repairs. The "Joyland" ran ashore near Clayton, N. Y., and the "Aragon" foundered off Wicket Point, Kingston.

Picton:—The Department of Public Works have had three engineers on the job surveying the breakwater at Wellington, to consider the advisability of completing the inner harbor at West Lake. The idea is to provide shelter for lake vessels, and also to make it possible to load the product of the West Lake Brick Products Co., and the Canning Company.

Cleveland.—The shipment of ore is moving faster than it has been for some time, and although some of the contract boats have not yet got cargoes, most of the shippers are doing some business. The ore trade is furnishing most of the down bound business for the large fleet, which is more numerous than that of last year. There is little demand for grain tonnage.

Montreal:— Service has been started from Montreal direct to Venezuela and Columbia, as the result of a visit paid to Montreal by trade agents from Central America. These were Mr. H. Hughes, representing the R. J. Jones Co. of Colombia, and Mr. J. C. H. Heldring, a director of the Curacoa Trading Co. of Amsterdam and Curacoa. The first sailing was by the "Berlin" on June 5th, carrying a cargo of 2,500 tons.

Halifax.—On June 8th the Norwegian steamer "Sangsted," 2,418 tons, arrived in a leaky condition, the result of having run ashore on Seal Island, off Cape Sable during a fog which was very thick. She was able, however, on the next flood tide to release herself by means of her own power and came on to Halifax where she expected to complete her cargo of sugar for the United Kingdom. The steamer had part of her cargo of sugar from St. John, N. B.

Montreal: — The Canadian Pacific Steamship Co., acting as traffic agents for the Norwegian-American line, announce a new service between Canada and Norway direct. The service will be carried on by large modern cargo steamers, two of which, the "Idefjord" and the "Topalsfjord" were built in Montreal by the Canadian Vickers Ltd. Trade between Scandinavia and Canada will be expanded by the resumption of this service.

Montreal:—At the recent Dominion Council of the Canadian Navy League, the newly elected president, Mr. Sam Harris, stated that he was perfecting plans for a trade ship to advertise Canadian goods. He hoped to be able to arrange for this ship to tour the seven seas, and that she would start before another year had passed. Mr. Harris said that he thought the ship would be worth her weight in gold to Canadian trade.

Port Colborne:—The break in the canal has been repaired, and locking resumed after the damage done by the grain steamer "India" when she crashed into the locks. A considerable portion of the steamer's cargo was damaged at the time, as she settled down on the bottom of the canal, and the cargo had to be lightered. Her owners, the Canada Steamship Co., have been presented with a bill for $11,000 for the damage to the lock.

Quebec:—Some changes have been made by the Quebec Harbor Commissioners in the charges levied on vessels loading grain at that port. The 7 cents per net ton register on vessels loading full grain cargoes has been discontinued, and the mortgage charge of 60 cents per hundred tons register has also been abolished. These charges have been in force in the port of Quebec for more than thirty years, and were the cause of much vexation to shippers.

Cleveland:—Commencing June 11th, lake carrying charges on ore have been reduced about 10 cents a ton, or a cut of 12½ per cent. A cut has also been made in the rail rates from lower lake ports to the furnaces, effective June 15th, amounting to 10 per cent. It is said also that a couple of roads are making a voluntary reduction in freight from mines to the upper lake ports, to be effective on July 1st. This should stimulate shipments, as many furnace men have been holding off, waiting for a reduction.

Toronto:—The "City of Ottawa" docked at the new shed of the Canada Steamship Lines on June 10th, being the first steamer to tie up at the new harbor works of the Toronto Harbor Commission. She is the first vessel that ever docked in Toronto in thirty feet of water, but no particular celebrations marked the event. As soon as she was tied up, the work of unloading commenced, and Toronto's new deep water harbor was really inaugurated.

Wallaceburg.—The government has started dredging operations at Wallaceburg, intended to make a possibility of the coming of large freighters to the works of the Dominion Sugar Company, situated at that port. The present means of getting their raw material is by barge through the Erie Canal, Lake Erie, and Sydenham. Each barge contains enough sugar to keep the plant running for two days, and three boats are in use. This is said to give good satisfaction.

Port Arthur:—The finding of the wreck commissioner, Capt. Demers, concerning the collision between the steamer "Glenfinnan" of the Great Lakes Transportation Company, and the "Midland King" of the Canada Steamship Lines, found both captains in default, and also the first mate of the "Midland King." The certificate of the master of the "Midland King," R. F. Fayette was suspended for two months, and Capt. Foote of the "Glenfinnan," suffered the same fate. Norman H. Miller, of the "Midland King" first mate, had his certificate suspended for three months.

Ottawa:—The Canadian Government Merchant Marine did not put in a tender for the steamship service between Canada and the British West Indies, the reason being that they have no vessels complying with the requirements as to passenger accommodation and cold storage. The contract was renewed with the Royal Mail Steam Packet Co. of London, the previous contractors, the service being a fortnightly mail, passenger and freight from Halifax to Bermuda, British West Indies, and Demerara, returning via the same ports to St. John, N. B. It is subject to cancellation at thirty days' notice.

Lubrication and Lubricating Mediums

Mineral, Animal, Vegetable and Compounded Oils—Their Subdivisions and Varied Uses—Viscosity and Methods of Testing—Selection of Oils—Oil Refining

By W. A. LUDWICK.
Paper Read Before the Virginia Section A. S. M. E.

"LUBRICATION" and "Lubricants" may be defined as follows:

Good lubricants are substances, semi-fluid,, or fluid, capable of forming and maintaining films of sufficient thickness between two rubbing surfaces to prevent actual friction between the surfaces, substituting for it the fluid friction of the lubricant itself, and may be considered in four classes, viz.:

(1) Straight Run Mineral Oil.

(2) Blended Mineral Oil.

(3) Compounded Oils, or two oils of a dissimilar nature compounded for special work—as a Mineral Oil and an Animal or Vegetable Oil.

(4) Animal Oil.

Mineral Oils are manufactured from crude petroleum and shale. The petroleum lubricating oils used in the United States are made from crude oils which may be classed in the following manner according to their natural characteristics.

(a) Paraffine Oils.—Composed chiefly of hydro-carbons of the paraffine series and found chiefly in Pennsylvania, West Virginia and Eastern Ohio.

(b) Asphaltic Oils.—Composed of hydro-carbons of the naphthene series, found principally in California, Texas, Louisiana, and the Mid-continent Oils produced in Kansas, Oklahoma and Illinois.

Lubricating oils made from the paraffine crudes have high gravities, high flash and fire tests, high congealing points and low viscosities unless blended with steam-cylinder oils. Asphaltic base oils have low gravities, lower flash and fire tests, congeal only at temperatures below zero degrees Fahrenheit, and can be made in any desired body without blending.

These oils may be divided into two general classes:

(1) Engine and Machine oils, including Dynamo, Turbine, Spindle Oils, etc., are intended for external lubrication.

(2) Steam Cylinder Oil and Valve Oils—used for the internal lubrication of Steam Cylinders and Valves. Motor Oils and oils for internal combustion engines may be considered as a separate class, though they are not essentially different from some of the highest class turbine, engine and machine oils.

One cause of the loss of power in a steam engine is friction. In all engines there are so many moving parts that it is of the greatest importance that friction should be reduced as much as possible. This is done by making the surfaces in contact smooth and of ample size; also making them of different metals ,and the use of suitable lubricants. Up until about twenty years ago the moving parts of engines were lubricated with various kinds of animal oils, principally lard oil. Of late years, or since the introduction of mineral oils, animal oils have been almost completely eliminated due to the fact that there has been a vast improvement in mineral oils, and also that lubrication is to-day done on a more efficient basis. In most all reciprocating engines the oil is reclaimed, filtered and used over again, which was impossible to accomplish to any great extent with animal oils.

Engine and Machine Oils should meet the following requirements:

(1) The oil should be of sufficient viscosity or body to keep the bearing surfaces apart at working temperatures.

(2) It should possess such qualities as will reduce frictional losses to a minimum.

(3) It should remain fluid at such low temperatures as will be met under ordinary service conditions.

(4) It should meet service requirements as to durability, separation from water, etc.

(5) The flash point should be sufficiently above the working temperatures to allow a reasonable margin of safety.

(6) It should have no tendency to decompose or to form deposits which will gum up the machine and increase the friction.

(7) It should contain no impurities which will corrode or pit the bearing metal.

In general, but more especially with high and medium-speed machines, the best practical guide as to the suitability of a lubricating oil is the amount of frictional heat produced with that oil in use. Frictional heat indicates wasted power, and, in the case of a bearing is determined by the difference between the temperature of the bearing in operation and the temperature of the room in which the machine is running. In general, one of the indications of an improvement in lubrication is the reduction of the amount of frictional heat. However, there are so many other factors which enter into the determination of the ultimate value of a lubricant that the amount of frictional heat as indicated by the bearing temperature is not in itself conclusive proof of the superiority of one lubricant over another.

Motor oils and oils for internal-combustion engines are subjected to extraordinary conditions. Their requirements are, therefore, somewhat different from other lubricant oils, and may be classed as follows:

(1) The viscosity should be such that the film of oil will be sufficient to keep the metal surfaces apart.

(2) The oil should possess such characteristics as will permit it to form a seal between the piston rings and cylinder walls so as to secure a high degree of compression.

(3) It should be of such a nature as to be converted into vapor without decomposition, even under extreme heat, so that the oil which gets into the combustion chamber will pass off with the exhaust as vapor without leaving an excessive carbon deposit.

(4) It should be of such a nature that whatever carbon is deposited is soft, and easily removed.

(5) The cold test should be low enough to meet all temperature conditions.

The proper viscosity for a motor oil should be determined by the piston ring clearance and the conditions of the rings and cylinder walls. A wide clearance of worn rings, either of which causes poor compression, requires a high viscosity oil in order to secure the best results. If the piston rings are closely fitted to the cylinders a light-bodied oil should be used. If too light an oil is used too much oil will get past the piston rings on the suction stroke, and, on the compression stroke some of the fuel mixture will leak past the piston rings and condense in the crank case, making the oil still thinner. If the oil is too viscous there will be a loss of power. Good compression depends very largely upon proper lubrication.

Mechanical conditions involved in steam-cylinder lubrication require special oils for that purpose. In color cylinder oils are usually dark green or black, though the filtered oils are light green and bright red. Steam cylinder oils are, as a rule, very viscous, some of them scarcely flowing at ordinary temperatures. The viscosity of these oils is taken at 210 degrees Fahrenheit, whereas that of ordinary lubricating oils is usually taken at 100 degrees Fahr.

The conditions which are to be met in the steam cylinder are quite different from those occurring in the lubrication of external parts. In the case of steam cylinder lubrication the oil is broken up, or atomized, and used only once, and is then carried off with the exhaust steam. The chief considerations in the selection of a steam cylinder oil should be, first its viscosity, and second, whether or not it should be compounded.

The speed and type of the engine, the method of effecting the lubrication, the distance from the steam chest to the point where the lubricant enters the steam line, and the amount of moisture in the steam, should be all taken into consideration in determining the proper viscosity for a given case. It is necessary that the oil should be atomized or broken up into minute parts before it reaches the valves, so that it will be

carried by the steam and spread over the valves and cylinder walls in a finely divided state. Otherwise, the oil will pass out of the exhaust in nearly the same condition in which it entered the steam pipe, without providing any effective internal lubrication. A light-viscosity oil, so that the greater amount of moisture in the steam the lower the viscosity of the oil should be. The shorter the distance which the oil has to travel in the steam pipes, the one less the opportunity for atomization, and, therefore, the lower the viscosity of the oil should be. On the other hand, the farther away from the steam chest the oil is put into the steam pipe the heavier it can be, as time and distance are required for the heavier oils to properly atomize.

In ordinary cases, where there is a considerable amount of moisture in the steam the cylinder oil should be compounded with a certain amount of animal oil so that the oil will more readily form an emulsion and adhere to the cylinder walls. On the other hand, a straight mineral cylinder oil should be used where it is desirable to keep the animal matter out of the exhaust steam, as, for example, when the steam is condensed and returned to the boilers and used for other purposes.

Fixed Oils and Compounded Oils

Before the introduction of mineral oils for steam cylinders tallow was used exclusively, being melted in a tallow pot which was kept on top of the steam chest. After the tallow was properly melted, it was introduced into the cylinder through a tallow cup, usually fitted with a valve and screw cover, and located on top of the steam chest. Lubrication by this method was crude and very intermittent. However, it probably suited the times and the condition on the engines, examples of which can be seen and studied with interest in some of our great museums. Sperm oil was formerly used, both mixed and unmixed, with mineral oils, for light machinery and spindles. Porpoise-jaw oil is still used for the lubrication of watches and delicate mechanism, for which a thoroughly non-drying and fairly limpid oil having an extremely long life is required.

As far as the lubricating properties of animal and vegetable oils are concerned, they were excellent, as the heavier oils, such as castor, were able to withstand very high pressure, and the lighter oils, such as sperm, had a very low co-efficient of friction. The great drawback to their use, in addition to their high cost was their oxidizing tendency, formed by this oxidation. Moreover, acids were formed, which attacked the metals, causing pitting and corrosion. Therefore, pure mineral lubricating oils, if properly manufactured, can be used over and over again which is not the case with any of the fixed oils..

Nearly all lubrication of a general nature can now best be cared for by a straight mineral oil of the proper viscosity. For turbines or for any circulating system, a compounded oil is never used, as it causes an emulsion, which, above all is to be avoided, and only the best grades of straight mineral, filtered oils should be used for the latter purpose and should be selected strictly upon the basis of quality and suitable viscosity.

Greases

In general lubricating practice there are certain mechanical conditions which cannot be handled to advantage by lubricating oils, and for which it is necessary and desirable to use a semi-solid lubricant. To meet such conditions the form of the mineral oil is changed to a semi-solid state by a special process, and the resultant lubricant is known as grease.

Grease, as the term is used for commercial purpose, is a mineral oil thickened with soap. The soaps used for this purpose are made from an animal or vegetable oil, such as tallow oil, horse fat, lard oil, cottonseed oil, rapeseed oil, palm oil and rosin oil. The consistency of the grease is from soft to hard, depending upon the percentage of soap in the mixture. In practically all greases mineral oil constitutes by far the larger part, frequently as much as ninety per cent. of the finished product.

A grease manufacturer must be very expert in the methods of handling the various materials used in the manufacture of grease. Two greases might be made according to the same formula and still vary greatly in lubricating value, due to the difference in the methods of handling the various products used in their manufacture.

In the manufacture of most greases the animal or vegetable oil is placed in a steam-jacketed kettle and heated to the required temperature. Cream of lime or other alkali dissolved in water is then added, and this mixture is boiled and stirred until it is completely saponified or turned into soap. In the manufacture of the best grades the heating is continued until nearly all of the moisture is driven off. Part of the mineral oil is then stirred in, and the stirirng is continued with the addition of more oil until the proper consistency is reached. Lime and soda greases are made by first mixing the fixed oil and mineral oil and then adding the alkali. The finished product should contain no lumps and should be homogeneous in character.

For all lubrication where the speed is high and where oil can be retained in or around the bearing it is inadvisable to use grease, for the reason that lower bearing temperatures and lower power consumption can be secured by the use of oil. There are many places, however, where it is necessary to use grease, due to the fact that oil cannot be retained on the bearing surfaces, or due to the fact that the bearings are so located that it is impossible to get at them to oil them regularly. It is therefore, necessary to have a lubricant that will feed very slowly, and insure lubrication for an extended period without replenishing, and, as a general rule, grease should be used for lubrication only under slow speeds and high pressures, or in cases where fluid lubricants cannot be retained for a sufficient time or used with sufficient cleanliness during the period of operation.

Cup greases are primarily intended for use in compression cups which force the grease directly to the bearing surface. There are, however, a number of designs of compression and other types of cups. As cup greases are comparatively low in melting point, very little frictional heat is required to reduce them to liquid, consequently their consistency should depend very largely upon the mechanical method used to apply them to the bearing surfaces. The personal equation plays a large part in the selection of the grease of various consistencies, as different engineers with the same equipment vary in their opinions, some preferring a very soft grease and others a hard grease, irrespective of the requirements of the machine.

Unless compression cups are used, greases must depend upon the frictional heat of the bearing to soften it enough to be carried in between the bearing surfaces. At the same time it is necessary that the greases should not melt and flow away from the bearings, but should stay in a semi-solid state under bearing temperatures. Special grease, intended for use in relatively light temperature, can be of the same general consistency as the compression-cup greases, but of higher melting point. This permits of direct application to the bearings, as in the case of open-slot bearings. Or it can be fed through a copper pin cup. This cup does not have the compression device, but, instead, has copper wire, the function of which is to transmit heat from the bearing to the grease, so as to make it fluid enough to flow to the bearing. For extremely high surrounding temperatures a very hard and a very high melting point grease should be used.

If a grease is not properly manufactured, the oil will frequently separate under service conditons, leaving the soap in the cups and on the bearings in solid or powder form. This is caused by a defect in manufacture that cannot be discovered by the casual inspection of a sample of grease. Cup greases and general lubricating greases should not separate when subjected to working temperatures, and when cooled, should go back into a perfectly homogeneous mixture.

A grease is never better than the mineral oil used at its base. In other words, the lubricating value of a properly manufactured grease depends upon the mineral oil used in its manufacte. The soap acts as a thickener for the mineral, and it is the latter that does practically all of the lubricating.

The appearance of a grease is frequently very misleading. In endeavoring to make grease at a low price, it is the custom of some manufacturers to use the very cheapest mineral oils obtainable. It is possible to make a grease with these cheap oils which will appear just as good to the eye as a grease made from the very best grades of lubricating oil, but, as lubricants, they are greatly inferior to greases made from high class mineral lubricants. In the manufacture of some greases the soap is not boiled down so as to drive off the excess moisture, and, as a result, the finished product contains a large percentage of water. This lowers the cost of production without affecting the appearance of the grease. Moreover, many greases for heavy pressures and for rough work are filled with powdered soapstone, chalk, talc, and other fillers. This increases the weight, cheapens the product, and gives it an artificial body. Such fillers, however, should never be tolerated in a high-grade grease.

The low temperature to which a grease can be subjected without solidifying is a point which has frequently been overlooked in the past. It is particularly neecssary that greases used in low temperatures should be manufactured from low-test oils, and, therefore, they will not become solid even in very cold weather.

There are certain conditions which the hardest and the highest melting point greases cannot satisfactorily meet, and which include such work as that offered by different types of gears and wire rope. To meet these exact conditions a product has been perfected which, due to its great viscosity, its cohesiveness, its adhesiveness and its heat resisting properties, is now being used with wonderful success under conditions where ordinary greases have always failed to show efficient lubrication. A thinner lubricant has been developed for worm drives and other small enclosed high-speed gears.

The same products are used under conditions as affected by temperatures in connection with wire-rope lubrication. Here it has been found that the ordinary or best grades of oils or greases have only provided a temporary coating of the outer surface of a wire rope. While the outer coating lasted it offered some resistance to friction between the surface of the rope and the sheaves or drums over which the rope passes, or to the attacks of the elements to which the rope may be exposed, but it is the friction and corrosion of the inner strands that eats into the life of the cable. However, the lubricant which has recently been developed will, when properly applied, work in between the strands and thoroughly lubricate every wire of the rope as well as the hemp centre; it will not harden on the outside of the wire rope and will not peel or crack, and any rope dressing that will harden or crack will let in water, which rusts the wires, and rust is the great enemy of wire rope.

In order that the engineer may be in a position to more intelligently select suitable lubricants a little general information concerning the separation of the natural crude oil into various products used for lubrication purposes, and also by touching upon the most important test to which lubricating oils are submitted will give a better idea regarding the selection of proper lubricants, it being desired to bring out clearly those qualities which will cause an oil to be suitable or unsuitable for the contemplated work.

Oil Refining

Briefly, crude oils are separated into various products by the following methods of distillation—the "dry" distillation process in which the heat is applied directly to the bottom of the stills and the distillation continued until coke only remains and the "steam" process in which, beside the direct heat, steam is permitted to enter at the bottom and bubble up through the body of the oil, also the "vacuum" process in which, by means of a pump, a partial vacuum is created in the still. These various methods may be used singly or, as in most cases, two or more are combined before the finished products are arrived at. The advantage or disadvantage of using either or any of them would require too much space to properly cover here.

The stills, of course, vary greatly in design and size. In any case they are similar to an ordinary steam boiler without the tubes, usually being a horizontal steel shell set in brick work and connected at the top or dome with vapor pipes which lead to the condenser coils.

The boiling points of the various constituents of the crude, of course, determine when that part will vaporize and pass to the condenser.

The more volatile portions of the crude, such as benzine, gasoline, kerosene, and gas oil are distilled first, the cut from which general lubricating oils are made, coming over considerably later, and the steam engine cylinder stock is the residue which remains in the still after the other products are drawn off, providing steam is used in distillation.

Each cut coming from the still may, and usually does, undergo further distillation by different processes, or they may be acid treated, filtered through Fullers' Earth, filter pressed, sweated or sunbleached, and each process has its value in producing a product for a certain purpose. For instance, the cut from which general lubricating oils are made is subjected to numerous costly processes before it is ready for the consumer.

Filter-pressing and sweating are certain processes by which the paraffine wax is removed from the stock. Some oils are sunbleached or exposed in shallow pans to the sun, which causes them to have a permanent color.

Paraffine-base lubricating oils, when finished, seldom have a viscosity of over 250 seconds Saybolt, hence, in order to obtain the higher viscosities which are necessary for certain purposes, they must be blended with some other product of higher viscosity. The residue from the Pennsylvania crude is usually selected for this purpose, although various animal or vegetable oils can be furnished at practically any viscosity and they thus avoid the objectionable necessity of blending.

Paraffine base oils usually do not have a low cold or pour test, owing to the fact that it is both difficult and costly to remove the paraffine wax which is the cause of their freezing at low temperatures. They will seldom flow at a temperature lower than 30 degrees Fahrenheit. Asphaltic base oils, not having to contend with the paraffine wax, are practically zero cold test oils. That is, they will still flow at zero. Many of them will not freeze and will flow at 15 degrees below zero.

This quality is very important when an oil is to be used in equipment subject to extremes of temperature.

Other Oils

Animal, fish and vegetable oils are sometimes used, either alone or, as usually is the case, as a compounding for mineral oils for different lubricating purposes. The more important are as follows:

Whale oil, made from whale blubber.

Lard oil, made from the fat of hogs.

Neatsfoot oil, made from beeves' hoofs.

Tallow oil, pressed from beef tallow.

Sperm oil, made from the head of the sperm whale.

Cottonseed oil, made from cottonseed.

Rapeseed oil, pressed from rapeseed.

Castor oil, made from the castor bean.

Rosin oil, made by destructive distillation.

Certain of the above, such as lard oil, and tallow, not only have value when compounded with mineral oils, but, for some purposes good results can be obtained only by so compounding.

Selection of An Oil

It can be safely said that the only way to see what a lubricant is, is to actually try it out on the equipment that is to use it. However, it is not always possible to follow this method, and also even after a lubricant has been proven and selected, it is sometimes desirable to have certain specifications as a guide in future purchases. This can only be accomplished through a series of laboratory tests, and the following is a list of those tests generally made. They, of course, need not all be made in selecting oils for certain purposes:

1. Gravity.
2. Viscosity.
3. Color-Odor.
4. Cold test.

5. Flash.
6. Fire.
7. Carbon.
8. Water and Sediment.
9. Emulsification Tests.

Each of the above tests will be considered in the following paragraphs:

Gravity—By the gravity of an oil is meant its relative weight as compared to that of distilled water. Since a given volume of distilled water at a certain temperature always has the same weight, the weight of the oil being tested, instead of being expressed in grams or pounds, is said to have a weight which is a certain decimal fraction of the weight of the same volume of distilled water at 60 degrees Fahrenheit. This decimal fraction is known as the specific gravity of the oil, which may be defined as the ratio of its weight to the weight of an equal volume of distilled water. For example, if a certain volume of oil weighs 21 grams and the same volume of water weighs 25 grams, then the oil weighs 21/25 or 0.840 as much as the water, and, accordingly, is said to have a specific gravity of 0.840.

Specific Gravity can be determined in various ways, one of which is by means of the pykometer or specific-gravity bottle. A special bottle with a perforated stopper is used in the laboratory, but, with care, an ordinary bottle can be used. The bottle should first be thoroughly cleaned and rinsed, and then filled with cold distilled water and heated to 15.6 degrees centigrade, or 60 degrees Fahrenheit. At this temperature the water should just fill the bottle. The full bottle should be carefully weighed, and after emptying and drying it, the empty bottle should be weighed. The bottle should then be filled with the oil to be tested, heated to 60 degrees F., again having the bottle exactly filled with oil and weighed. In each case the weight of the empty bottle must be deducted from the total weight found. The specific gravity of the oil is the ratio between the actual weight of the oil and the actual weight of the water.

To the oil manufacturer or chemist a knowledge of the gravity of an oil is important, and several other instruments are in use to make these determinations but we have given the simplest means whereby the engineer may make some simple determinations should he so wish. In the first place it is one indication of the crude from which the oil is made. Light-gravity crudes are entirely paraffine-base crudes, and products of such crudes are of correspondingly light gravity. The Pennsylvania, Ohio, Indiana and northern Louisiana crudes are paraffine-base and light gravity crudes. The Texas, except from the Electra Field in the northern part, and the California crudes, are heavy gravity, and the products made from these crudes are correspondingly heavy in gravity. The experienced oil man can locate with a reasonable degree of accuracy the source from which a certain oil came, and in so doing its gravity is his chief guide. Furthermore, in refining and handling—certain crude gravity is an important factor, as it is a guide in the distillating process.

It will be remembered that the value of gasoline is determined by its range of distillation and not by its gravity. Of two gasolines having the same range of distillation, the heavier will give the greater power and the greatest number of miles per gallon, due to the greater number of heat units. Gravity has no bearing upon the value, in that it is an indication of the nature of the crude from which the oil is made. In the case of fuel oil, gravity is of more importance as it is an indication of the heat units in the fuel, the heavier the gravity the greater the number of heat units per gallon.

On selecting a lubricating oil, the oil expert never takes gravity into consideration, as it has nothing to do with the lubricating value. Twenty-five years ago all American oils came from Pennsylvania and the North, and were of light gravity. When the heavy-gravity crudes first appeared, though very valuable, they were entirely different: the refiners evidently did not know how to handle them to the best advantage, and for a time, the products were the results of practical experimentation on a large scale.

At the present time, however, for many purposes much better lubricating oils are being made out of these heavy gravity crudes than were even dreamed of five years ago. Properly manufactured oils from the southwestern heavy-gravity crudes have certain natural advantages for some purposes.

Specifications issued by most buyers of oils have now been widened to include oils made from all crudes. For instance, a specification written ten years ago for a gear oil would call for 25 degrees B. to 26 degrees B., which is so wide as to be nearly no specification at all, yet this is exactly the change that is taking place.

Lubricating products are to-day made from such a wide range of crudes and, therefore, are of both light and heavy gravity. So far as the consumer is concerned, however, gravity has very little significance, except possibly in the case of fuel oil.

Flash and Fire.—When any liquid is heated sufficiently it gives off vapor. For example, as water is heated it is converted into steam, gradually, until the boiling point is reached, and then rapidly. The same phenomena occurs in the case of oil, but in this instance the vapors which are given off are inflammable, and form an explosive mixture with the air. The danger of fire or explosion, especially in the case of kerosene or burning oils lead to the introduction of a test which would differentiate those oils which were safe for illuminating purposes from those which were so volatile as to make them dangerous. Later, when the mineral lubricating oils were introduced, the same tests were extended to these heavier oils, not because there was any particular danger of fire in the case of a properly manufactured oil, but rather as a guide to the refiner in his various methods of distillation.

The flash point of an oil is the temperature at which an oil, upon being slowly heated, will give off sufficient vapor to form over its surface a mixture with the air which, upon the introduction of a small flame, will ignite and go out. As the temperature of the oil rises, more vapor is given off, and when the production of vapor is sufficiently rapid, the oil takes fire and burns with a continuous flame. The fire point of an oil may, therefore, be defined as the temperature at which, upon the application of a flame, the oil will burn continuously.

Flash and fire tests are of special importance in the case of kerosene and petroleum spirits. Burning oils going into different states must be tested with the instruments which these states have legally adopted. While some of the states require no special cups, or require only "standard instruments," others specify the Tagliabue, the Foster, or the Elliott instrument. Most of the state laws specifying a minimum flash or fire test for burning oils were drawn up at a time when kerosene was the most valuable constituent of petroleum, and when gasolene was a drug on the market. At that time refiners endeavored to increase their yield of kerosene by lowering the flash point, with the danger of making a product which has too great a fire hazard, and was dangerous for domestic use. Consequently state laws were devised to prohibit the sale of any burning oils which would be dangerous, as shown by the flash point. To-day gasoline is more valuable than kerosene, so these laws are now of less importance.

As far as the flash point of lubricating oils is concerned it was soon discovered by the refiners of Pennsylvania oils that given lubricating cuts from these crudes would have higher flash points than similar cuts from asphaltic-base crudes. Accordingly, the high flash sales argument for lubricants was used very extensively, and innumerable specifications were drawn up which required a very high minimum flash point. Some of these specifications are still in existence, but they are rapidly disappearing. This sales argument, which is a talking point only and used by manufacturers who work only on paraffine base oil, is not being pushed as strongly now as at former times, due to the fact that many of the refiners who formerly used only Pennsylvania crude are now compelled to draw from Western and Southwestern crude and, therefore, to lower the flash point on their products. For general lubricating oils, the only requirement as to flash point is that the flash should be sufficiently high to allow a reasonable margin for safety. As the ordinary bearing temperature would not average more than 150 degrees F. a flash test about 300

degrees F. would have a margin of more than 150 degrees.

In the lubrication of steam cylinders, when superheated steam was first employed, it was thought necessary to have cylinder oils with a flash point higher than the total temperature of the steam. Super-heated steam in some instances reaches a temperature as high as 700 degrees F. It is possible to have a cylinder oil made from certain stocks with a flash point of nearly 620 degrees F., but these oils are so near the end of the distillation that it was found, in practice with high superheated temperatures, that the oil that stayed in the cylinder changed very quickly to coke and caused great damage.

The fallacy of the high flash argument on lubricants for gas engine oil can be shown by the following facts. The temperature in the explosion chamber of the gas engine cylinder is between two and three thousand degrees Fahrenheit. The maximum temperature of the gases is about 2,700 degrees F. and the average temperature about 950 degrees F. the temperature of the surface of the cylinder walls themselves varies probably from 500 degrees F. at the bottom. The piston top and upper rings are undoubtedly over 500 degrees

(To be continued)

NEW TELEGRAPH STEAMER

The telegraph cable steamer "John W. Mackay" which has been constructed at the Neptune Works, Newcastle-on-Tyne, of Messrs. Swan, Hunter, & Wigham, Richardson, Ltd., to the order of the Commercial Cable Co. of New York. completed a highly successful trial trip off the coast on Thursday, 25th inst.

The vessel has been designed to meet the owners' special requirements for their work in connection with the laying and repairing of their cables. She is propelled by twin screw reciprocating steam engines, which together with their boilers have been constructed by Swan, Hunter, & Wigham, Richardson Ltd. at their Neptune Engine Works. She is 360 ft. in length by 48 ft. beam by 35 ft. in depth; with an overhanging bow carrying three cable sheaves whilst a stern sheave is fitted aft.

The cable is carried in four cable tanks, with a total coiling capacity of over 50,000 cu. ft. and which are placed forward of the machinery. The cable working machinery includes picking-up and paying-out gears, electric turning-over gear, Lucas dynamometers and a Lucas patent sounding machine, the whole being supplied by the Telegraph Construction and Maintenance Co. Ltd. of their latest and most improved design.

The testing room is very conveniently arranged and equipped with all the special instruments required for the work.

The comfort of the staff on board has been specially considered in the designing of their accommodation. A large glazed shelter on the navigating bridge affords ample protection from the weather for all those on duty there. On the boat deck the captain has his accomodation, and there is also an ample chart room and navigating office. The ship's navigating officers and the many officers concerned with the cable work will have their staterooms, etc., on the shelter deck. Their dining saloon and smoking room on the upper deck below, on which deck are also the rooms for the engineers, petty officers, cablemen, seamen, etc.

The twin screw triple expansion engines are supplied with steam by three large single end boilers working at a pressure of 190 lbs. per square inch, under Howden's system of forced draught and fitted to burn oil fuel on the Wallsend-Howden system.

For the navigation and working of the vessel the latest patterns of auxiliary machinery are provided, including steam windlass and capstan, steam winches, steam boat hoist, steam steering gear, etc.

As in all cable repairing vessels the boats are a very important item and on the "John W. Mackay" they include a wooden motor lifeboat, four wooden lifeboats and one wooden whaleboat fitted with a small motor intended for the captain's use and one other wooden whaleboat. All the boats are of the very highest class.

The safety and comfort of all on board have been studied with the greatest care, and the arrangements made include ample ventilation, steam heating, electric light, electric bells, telephone, wireless telegraphy and submarine signalling apparatus.

On the trial trip everything worked without the slightest hitch and satisfaction was given to all concerned—a speed of 14 knots per hour being obtained.

The owners were represented on the trial trip by Capt. F. H. Lardner, under whose guidance and superintendence the vessel has been designed and built, and the builders were represented by Mr. G. F. Tweedy.

NEWSPRINT BY BARGE

On June 7th the barge C. C. Donoghue loaded 200 tons of newsprint paper and a second barge loaded a similar quantity the next day to be shipped by the all-water route to New York. Some two years ago water shipments of newsprint was made to New York owing to the freight congestion existing at that time. These barges were loaded at Three Rivers. The reason for the resumption of the barge trade on newsprint at this time is the high freight rates. It is stated that European pulp and papers are landing at New York at freight rates of from $3.00 to $4.50 per gross ton whereas the rail rate from the Canadian mills averages $8.50 per gross ton. To offset this great difference in freight many Canadian industries are endeavoring to ship by water and trust that they will be able to meet this foreign competition.

AN IMPERIAL AIRSHIP SCHEME

Strong support is being given by industrial interests in Great Britain to the scheme for establishing a commercial airship service between Britain, India, and Australia. It is confidently expected that the British Air Ministry will recommend the government to assist this enterprise, for which detailed and promising estimates have been drawn up. Meanwhile the speed of British air services to and from France is increasing. Recently a record was established by a British machine on which four successive single trips between London and Paris were made in the interval between 6.55 a.m. and 5.40 p.m. Out of 10¾ hours between the first ascent and the last descent 8 hours 52 minutes were actualiy spent in the air. The total distance covered was about one thousand miles.

SUBMARINE ENGINES FOR ELECTRIC POWER STATIONS

War, it is a comfort to reflect, has its uses for times of peace, especially when it involves the capture of valuable engineering plant. When Germany surrendered its submarines, six of the engines thus provided were installed in a British electric power station, the total cost being about half the ruling cost of ordinary engines of a similar capacity. The engines were thoroughly overhauled and reconditioned by a British engineering firm before being put into action again; and as they were oil-driven they proved of great value during the coal strike last year. They have also proved much more economical than the steam driven steam sets which previously did the work in that station.

Ottawa:—It was announced by Hon. W. C. Kennedy that twenty-seven of the smaller ships of the Canadian Government Merchant Marine were to be laid up, and disposed of as soon as possible.

* * * *

Halifax.—The Halifax Shipyards Co. Ltd. have secured the contract to raise the Canadian Government lighthouse supply and buoy boat "W. H. Lee," which was partially burnt and sank in Halifax Harbor last winter.

* * * *

Montreal.—There are at present two Canadian Government Merchant Marine steamers in Montreal harbor which are laid up, namely the Canadian Ranger and the Canadian Rancher. Four other of these Canadian Government Merchant Marine steamers have been laid up for some time past but are about to be commissioned for trips to Glasgow, Cardiff and Swansea.

Fifteen Years of Naval Engineering

COMMENTING on the retirement of Sir George Goodwin, Engineering says that the present occasion is appropriate for reviewing the field of naval engineering, and the important changes that have taken place under the regime of Sir George and his predecessor, Sir Henry Oram.

The fifteen years under review constitute an important landmark in naval engineering from more than one aspect. The steam turbine had, in 1906, with the completion of H.M.S. Dreadnought, established itself as a reliable prime mover for the largest warships, and in the adaptability of this type of engine to develop large powers as a new era had developed. The naval engineers were very proud of the large powers of 15,000 i. h. p. per shaft obtained in the cruisers of the "Good Hope" Class with reciprocating engines, but experience with such large engines had only too plainly indicated that this type of steam engine was approaching the possible limits in size and power that could be relied upon to give uniformly satisfactory results from all points of view. The steam turbine opened up a new field, and rapid advances began at once to be made.

Already, in 1907, warship machinery of 41,000 s.h.p. were under construction and in 1909 the design of the "Lion" Class of battle cruisers, the machinery of which develops over 70,000 s.h.p. was put in hand. An increase of more than 100 per cent. (compared with the highest powers on service previous to 1907) in the total power installed in one ship in a period of a few years is noteworthy. It was hardly foreseen at the time of their construction that these vessels would form a striking arm of the Grand Fleet some years later, commencing in 1914, and the fact that these vessels performed brilliant service in this capacity and proved themselves superior in speed and maintenance of power as compared with vessels of a similar class of later date and under more adverse conditions, shows that the difficulties attending the installation of such large powers had been accurately foreseen and overcome.

First Oil-Fired Ships

Concurrently with the design of larger relative powers in other classes of ships, active development had proceeded in the Navy in the use of oil fuel. The practical difficulties attending the satisfactory burning and application of this fuel have been overcome by the zeal and ability of naval engineers. The actual application to vessels on a large scale, was, however, in 1907 and for some years, limited owing to the dependence of this country on overseas supplies. This problem of course still remains. It undoubtedly gave a good deal of anxiety during the war, but measures had been taken to cope with the exigencies of such a situation as far as could possibly be foreseen.

With the coal-burning installations it was very early realised that the large powers possible with the turbine were tending to be restricted in warships by the large weight and space in the ships necessitated by boilers in which coal was the principal fuel. The purely oil-fired boilers were therefore fitted for some years in torpedo-boat destroyer craft only, as in these vessels considerations of high power with minimum of weight and space occupied, were of the greatest importance. The experience in this class of vessel, commencing with the "Tribal" type which began their trials in 1907, was however sufficient to establish definitely the enormous superiorities of this type of fuel for other classes and, but for the supply difficulty, it is certain that we should not have waited till 1912 before its application to capital ships.

In this year the battleships of the Queen Elizabeth class were designed in which this fuel alone is used. The power in these ships is 75,000 s.h.p., as compared with 23,000 in the Dreadnought designed some seven years earlier. It must not be overlooked, however, that general developments had permitted the design of the large battle cruiser Tiger, with oil still as an auxiliary fuel, and in which 108,000 h.p. was developed. This vessel, with the exception of the 70,000 h.p. cruisers of the Hawkins class, was the last of the high-speed warships to be fitted for coal-burning and the whole of the battleships, battle cruisers, light cruisers and torpedo-boat destroyers in the post war fleet are oil-driven, with the exception of the cruisers referred to and in which for special reasons coal-burning generators in one boiler room were retained. In the design stage of the most modern battleships in commission, viz., the Royal Soverign class, coal and oil were both arranged for, but this was changed before construction had advanced.

In 1910, Sir Charles Parsons, who had been experimenting for some years to solve the problem of the adaptation of the high-speed turbines for mechanical reduction gearing in the lower-speed ships, fitted the first set of cargo steamer Vespasian, and those in control of the engineering policy of the Navy at once saw the possibilities of such reduction gearing even for high-speed ships, and, taking a very bold step which, as events showed, was fully justified, very early adapted it for powers up to 11,000 h.p. per shaft in light cruisers.

During the period of the great war those at the head of the engineering department of the Fleet had necessarily to cope with a situation of great difficulty, and often under unfavourable conditions. With the large war programmes developed, accompanied as they were by acute questions in relation to personnel, shortage of supplies and the maintenance of the sea-going fleets in efficient condition, the greatest courage, resourcefulness and ability, coupled with ripe experience and mature judgment had necessarily to be exercised. This period was one of unexampled strain, and the fact that the machinery of the vessels of the Navy, which was subjected to wear and tear far exceeding anything even anticipated, came successfully through this period, says much for the work of the officers, upon whom devolved the higher technical responsibilities. Mechanical gearing, which had hardly passed the experimental stage, became a necessity if best possible results were to be obtained in the circumstances, but again the foresight given to its application enabled it to be developed for powers not thought possible at the time, and as a culmination it was eventually applied up to 36,000 s.h.p. per shaft in the battle cruiser Hood and three other vessels, which latter, however, were not completed. The power in the large destroyers of the flotilla leader type rose to a total of 44,000 s.h.p. with this type of machinery .

Special Types

Quite apart from a general increase in powers and the problems of building on a large scale, the period called for the design of novel types of vessels, which in many cases presented special engineering difficulties. As a particular case, may be cited the large and fast steam submarines of the "K" class. During this period the application of the heavy oil internal combustion engine for much higher powers than had previously been contemplated, called for serious consideration, and although presenting great difficulties for naval work owing to the weight of these engines, progress has been made in certain directions in their application other than in submarines. That this engine has never been seriously neglected by the navy as some critics may at times imply, is made evident in Sir George Goodwin's paper on the development of Diesel engines for naval purposes, recently read before the Institution of Shipbuilders and Engineers of Scotland, which was printed in the Journal of Commerce. The light high-speed internal-combustion engine has also been successfully adapted for naval

"Joy Shots" That Lead to Hell

By JUDGE EMILY F. MURPHY (*Janey Canuck*)

THIS IS the first of two articles in which Judge Murphy describes the menace that exists in Canada to-day in regard to the illegal traffic in narcotics. It gives actual facts from many Canadian cities and shows how the hypodermic needle is an even greater evil to combat than the opium pipe. The second of these articles will likely be in the July 15th issue.

Is Bootlegging a Passing Phase?

How common is bootlegging in Canada today? How do the members of the bootlegging profession carry on their business and what is their relationship to the officers of the law? These are two of the questions which are answered by A. Innes MacKenzie in a very colorful article describing the adventures, the fortunes and humorous rencontres of Canadian bootleggers from the Atlantic to the Pacific. Mr. MacKenzie writes whereof he knows, as he has spent several months studying this question and even associatting with many of the bootleggers themselves, in the interests of the readers of MACLEAN'S MAGAZINE.

Other Features in the

JUNE 15th MACLEAN'S

What Will Radio Do to Us?
by J. L. Rutledge.

What Shall I Do With My B.A.?
by G. E. S. Pringle.

Babs and the Manager
by Leslie Gordon Barnard.

The Golden Fleece
A long "short" story
by Bertrand W. Sinclair.

A Ruthenian Wedding
by Clara Ward.

Barnstorming on the Chautauqua
by Agnes C. Laut.

The Valley of Bleached Bones
by Madge MacBeth.

Ovington's Bank
An intensely interesting serial
by Stanley J. Weyman.

Is the Canadian Flapper a Menace?

This is a question raised by Mrs. Gertrude S. Pringle in a startling article dealing with conditions as they too frequently exist in some Canadian centres. Extraordinary conditions are described by Mrs. Pringle, who is a thorough and conservative investigator. It is only too true, evidence regretfully shows, that some Canadian flappers are very much akin to their American sister who "parks her corsets and indulges in petting parties."

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use in the vessels of the coastal motor-boat type.

One of the present important responsibilities of the engineer-in-chief is that of the efficient training of the officers and personnel in charge of, or operating, the machinery of warships. This question has always received great attention by Sir George and, as may be testified by those who have come in contact with him on these matters, his sound judgment and accurate realisation of the needs of the service have always been a valuable asset. Towards the end of his tenure of office he has been active in arranging for the training of officers in engineering, conditions having shown the necesity for a modification of the scheme obtaining during the last twelve years. The great interest he has taken in this question and his knowledge of sound educational principles are well illustrated in the recent address given by him at the Hartley Institute, Southampton, in which the desiderata of the training of an engineer were elaborated.

Sir George has at all times considered it his duty to see that the engineering side of the Navy has been represented, and naval engineering matters kept well to the fore in the discussions arising at the meetings of technical societies. On the council of the Naval Architects and as president of the Institute of Metals for two years, he has displayed special activity in this direction, to mention only prominent instances. That these activities will not cease with his retirement is shown in his having accepted the presidency of the Institute of Marine Engineers for a period commencing in September next.

Difficulties of Present Time

Although as regards new construction the position for the last year or two has been somewhat one of stagnation, the responsibilities of the Engineer-in-Chief at the present moment are of no light nature. With the reductions in personnel and the urgent demands for economy, the position calls for peculiar abilities in seeing that efficiency and progress are maintained. In spite of the great developments that have taken place in the last few years, the situation is ever one of progress, and never have greater problems presented themselves to be solved than at the present time. In one direction we have seen the adoption for large powers of the turbo-electric system of propulsion in the large vessels of the United States Navy, the merits of which have to be seriously considered in this country. The internal-combustion engine makes rapid strides in the commercial world, and presents an even more interesting problem as regards its adaptability for warships which only energetic experiment and research will solve. The posibilities of developing the internal-combustion turbine have also to be borne in mind. Under previous regime and during the war it was made apparent that the Navy had its own special difficulties to solve, and the Admiralty Engineering Laboratory was established in 1917, and is still an active concern, in which new developments, mainly in connection with the high-speed internal-combustion engines are being tested.

Admiral Dixon

Admiral Dixon takes over the position of Engineer-in-Chief therefore, at a time when it is essential that an officer with a power to visualise clearly the present position and the future is most necessary. He was a distinguished student of the Marlborough and of the Naval College at Greenwich, and has gained considerable practical experience in important diverse appointments during his career.

Leaving the Marlborough in 1883 he became Chief Engineer in 1900 and Engineer-Commander in 1904. Apart from service in several ships, he has held positions at the Admiralty, and was Engineer Manager of Portsmouth Dockyard from 1912 to 1917, being promoted to Engineer-Captain during his tenure of this appointment in 1915. He served from 1917 to 1919 as Assistant to the Director of Dockyards, and became Assistant Engineer-in-Chief in May, 1919, and was promoted to the rank of Rear-Admiral in the same year.

In June, 1920, he became Deputy Engineer-in-Chief, which position he now relinquishes to attain the highest position in the engineering branch of the Navy. With such experience behind him there is no reason to doubt that a progressive policy will be maintained, and that British naval engineering will still keep its position in the front rank at a standard which has given it its prestige in the past.

BRITISH PORTS

The following brief descriptions of the facilities, recent improvements, and contemplated developments at the principal British ports, are deemed important enough to warrant their production herein and their reproduction in the foreign press of some countries. These matters in considerably more detailed form, together with approximate rates and charges, are obtainable, if desired, from the department, to which enquiries abroad relating to such questions can be referred for detailed information and advice.

London.—The position of London has for centuries made it an important port for the commerce of North-Western Europe, and it is at present connected by long distance lines with the whole of the world, and by shorter lines with Scandinavia, the Baltic, Germany, Holland, Belgium, and France, these lines taking trans-shipment cargo from the long distance lines to all the destinations in North-Western Europe.

The port is administered by the Port of London Authority, created in 1908, and consisting of 28 members, representing the Admiralty, Board of Trade, Trinity House, the Corporation of the City of London, the London County Council, and shipowners, merchants, and wharfingers.

The Authority took over the docks which were in the hands of the London and India Dock Company, the Millwall Dock Company, and the Surrey Commercial Dock Company. The limits of the Port of London commence at Teddington, and include all the creeks, rivers, water courses, etc., between that point and an imaginary straight line drawn from Havengore Creek in the County of Essex, and Warden Point in the Isle of Sheppey, with the exception of that part of the River Medway under the jurisdiction of the conservators of the River Medway, the parts of the River Lea within the jurisdiction of the Lea Conservancy Board, and the Grand Junction Canal.

The principal docks are on the north side of the river, and include St. Katherine's Dock, with a water area of 10⅛ acres and a quayage of ⅞ths of a mile; the London Dock, with a water area of 35½ acres, and a quayage of 2¼ miles; the West India Dock, with a water area of 92¼ acres and a quayage of 4⅛ miles; the East India Dock, with a water area of 31⅝ acres and a quayage of 1⅜ miles; Millwall Dock, with a water area of 35⅛ acres, and a quayage of 1¾ miles; the Royal Victoria Dock, with a water area of 93¾ acres and a quayage of 5⅛ miles; the Royal Albert Dock, with a water area of 87 acres and a quayage of 3⅛ miles; the recently opened King George V. Dock, with a water area of 64¼ acres and a quayage of 2⅜ miles; and Tilbury Dock, with a water area of 89⅞ acres and a quayage of 3⅛ miles.

On the South side of the river is the important Surrey Commercial Dock with a water area of 164⅞ acres and a quayage of 5⅜ miles, while the Surrey Canal has a water area of 36⅜ acres and a length of 3½ miles. The total water area of the wet docks and basins under the control of the Port of London Authority amounts to 704⅜ acres with a length of quayage of 29½ miles.

In addition, the River banks are lined with wharves and warehouses principally privately owned. Sea-going vessels can be berthed as far up as London Bridge.

Port work recently completed or under construction, include new quays and sheds at London, West India, and East India Docks, the lengthening of the dry dock at Millwall Docks; the new George V. Dock, which can handle the largest steamers, the construction of new sheds on the south side of the Victoria Dock, the equipment of the Royal Albert Dock with 43 three-ton electric cranes, and an extension to Tilbury Docks, which will give 17 acres additional water area and 600 yards of quayage with a depth alongside of 42 feet 6 inches. At the last named docks a two-storey jetty 1 000 feet long with 30 feet of water alongside at L. W. O. S. T. (low water of ordinary Spring Tides) and equipped with appliances for rapidly discharging vessels into railway trucks, barges, or covered storage, is now completed and

is connected with the Midland Railway by an approach viaduct.

Among other works authorized are an extension of Surrey Commercial South Dock with a water area of 11 acres and a floating passenger landing stage 1,700 feet long with a depth alongside of 35 feet L. W. O. S. T., adjoining the Midland Railway Station at Tilbury, while additional locks and warehousing accommodation are being provided at London, West India, Millwall, and East India Docks.

Further works contemplated include the construction of a new dock on the north side of the existing Royal Victoria and Albert Docks with a water area of 126 acres, a depth of 45 feet, and a quayage of 3 miles, and the construction of a new lock at Tilbury and a dock extension with a water area of 42 acres to be followed at a later date by another extension with a water area of 80 acres.

The various dry docks at present available in the port are capable of taking vessels up to 700 feet in length and 70 feet beam. The total storage space available in the port can accommodate over 1,000,000 tons. There are special bonded warehouses for the storage and working of such bonded goods as tobacco, sugar, dutiable canned goods, tea, rum, wines and spirits, dried fruits, coffee and cocoa, and there are free warehouses for all classes of merchandise and specially adapted accommodation and show floors for wool, rubber, gums, drugs and spices, feathers, etc.

Timber cargoes are generally brought to the Surrey Commercial Docks where covered and uncovered storage spaces of 41 acres and 56 acres respectively are provided, and there are also timber ponds 70 acres in extent. Specially designed cranes and sheds for the handling of mahogany, teak, walnut, ebony, and other hard woods are provided at the West India Docks.

The cold storage accommodation provided by the Port of London Authority can take 1 250,000 carcases, while privately owned stores in the Port make the total space available in London equivalent to four million carcases. The bulk of the imports arrive from Australia, New Zealand, and South America, and are discharged at the Royal Victoria and Albert Docks. At these docks vessels can discharge their meat cargoes by means of electrically driven elevators and band conveyers into warehouses where carcases can be sorted prior to delivery to insulated railway wagons for the provinces, insulated vans for Smithfield Market, or for storage. During 1920 the equivalent of 16½ million carcases of sheep were imported into London; about 63 per cent. being landed with the Port of London Authority for storage or direct distribution.

The importation of grain into London amounts to nearly two million tons per annum, over half of which consists of wheat. Floating pneumatic and bucket elevators with a capacity of 2,750 tons per hour are maintained for the discharge of grain at any of the docks, and there are granaries at the Royal Victoria, Surrey Commercial, India, and Millwall Docks, with a capacity of 128,600 tons.

About 70 per cent. of the total importation of wool into the United Kingdom passes through London. During 1920, 1½ million bales of an average weight of 3½ hundredweight each were dealt with by the Authority, of which 1,080,000 bales, equivalent to 67 million fleeces, were exhibited for sale.

During 1920 the quantity of wines and spirits and rum received by the Port of London Authority amounted to 8 million gallons. The principal wines stored are port, sherry, and Maderia, and the vaults at the London Docks can accommodate 105,000 pipes. The brandy vaults, 4 acres in extent, are situated at the same docks, and the Authority carry out the operation of vatting of spirits for blending purposes and bottling for export.

Rum is handled at the West India Docks, where there is storage space for over 40,000 puncheons.

Of the total importations of rubber during 1920 85 per cent. passed through the Port of London, where the Authority maintain a staff who tare, verify quality, sort, and forward to the importer samples on which sales are effected.

Tea warehouses are situated at the St. Katherine's Dock, Cutler Street, and Commerical Road, where packages are sorted, and sampling, blending, and bulking operations are undertaken. The quantity handled annually is about 200,000 tons.

Coffee, which is imported mainly from South and Central America, is stored at the London Docks, where samples are taken, and the work of husking, polishing, and sizing is performed by the Authority's staff.

The tobacco warehouses are situated at the Royal Victoria and the West India Docks, where samples are extracted for brokers and merchants. The damaged leaves are separated from the sound, and the latter re-worked and repacked by the Authority's staff. The stocks held by the Authority usually amount to over 35,000 tons.

A scheme has recently been formulated for the construtcion of a tunnel between Gravesend and Tilbury with a railway connection from near Pitsea to the Midland Railway's main line to the north at Luton, which would greatly facilitate the distribution of traffic entering the country via Tilbury Docks.

The value of the total traffic of the Port of London increased from £412,000,000 in 1913 to £820,000,000 during 1919.

The Kingsbury Works, Philadelphia, have issued a well illustrated little booklet describing their "Kingsbury Thrust Bearings." It is designated as Catalogue C, and bears the date of January 1922. The thrust block is described in detail, and a number of illustrations of various types of installations are also included. Practically all the information necessary for a prospective user of thrust block bearings is given in this catalogue, and directions for giving the necessary information for the makers to give quotations on are placed in the foreword of the catalogue.

Edmonton:—The new stern wheeler "Athabasca River" built of British Columbia fir for the Hudson Bay Co. is now ready for service. She is 146 feet long, 36 feet beam, and three feet draught, on which she can carry a cargo of 150 tons. The boilers and engines were built at the Polson Iron Works, Toronto, and she is to have a speed of 13 knots. She will also tow a 200-ton barge in addition to her own cargo. The vessel will be equipped with a searchlight, and steam steering gear. She will carry 58 passengers. Her route will be on the Athabasca River from Fort McMurray, to Fort Fitzgerald on the Slave River.

The "Senator Derbyshire," a wooden vessel of 987 tons, owned by the George Hall Coal Co., Ltd., was on her way from Salmon Bay, Saguenay River, to Ogdensburg, with a cargo of pulpwood on April 25th, when she grounded on Isle aux Vaches at half past one in the morning. The investigation brought out the facts that lights were plainly visible at the time. The evidence of the master, the pilot, and the first officer, Victor Gendron, was heard and the finding of the court was that the pilot, who hitherto has observed his duties in a most faithful manner, must be reprimanded for "omission of necessary vigilance" in this case. The master also reprimanded for not being at his post, it being his watch at the time of stranding.

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The owner of Canadian Patent No. 202,168, granted July 27, 1920, to PAUL ARMAND JEAN-MARIE CONSTAN, of Mangam, near Brest, France, for improvements relating to an arrangement for propelling barges, lighters, etc., to facilitate loading or unloading of vessels, is prepared to grant licenses for the use of the said patented invention or to sell part or the whole interest in the patent.

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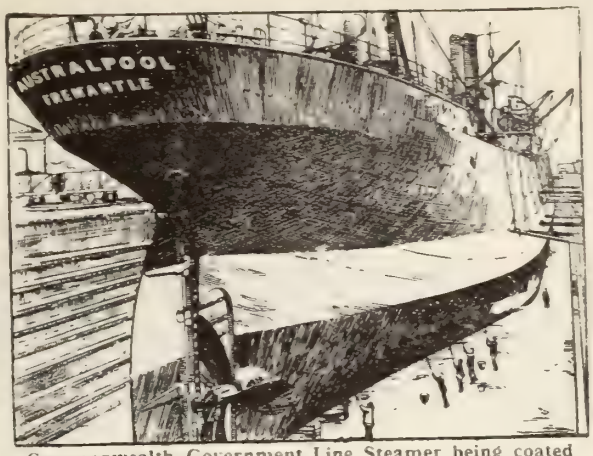

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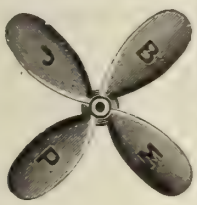

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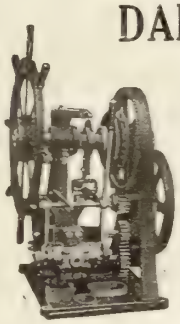

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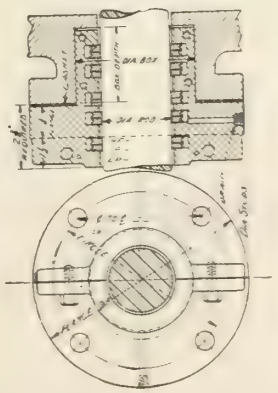

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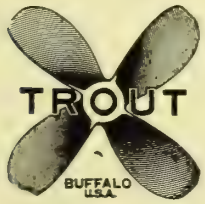

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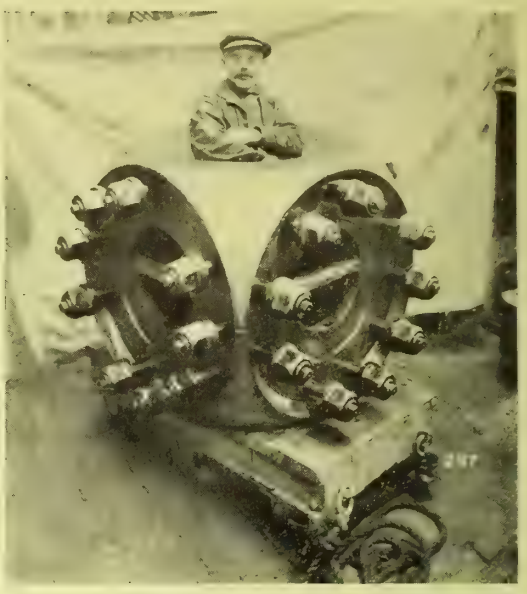

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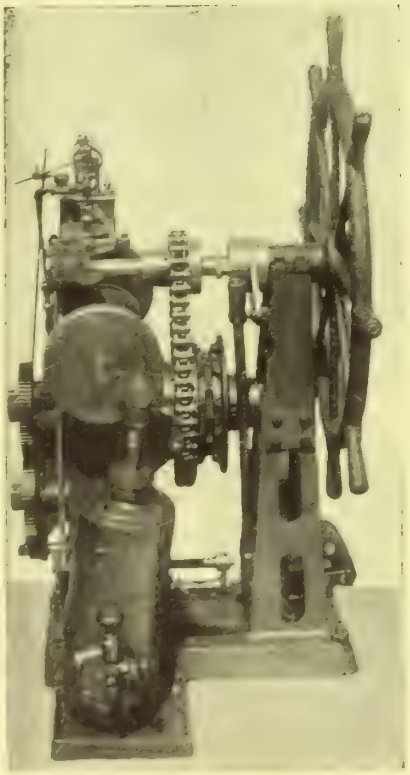

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News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

THERE has been a slight improvment in the shipping trade in Quebec, compared to the corresponding period of last year, up to the 15th of June, the latest date for which figures are available. The trade of the port, is not, however, by any means satisfactory. On the contrary, it is very disappointing. This is attributed by the Quebec shipping interests, to the action of the agents of the British lines who are located in Montreal, and will not allow Quebec to get a share of the trade as she should do.

The feeling in this connection was pertinently exemplified in a statement made to your correspondent by a prominent Montreal steamship agent, during a business visit to Quebec. During the conversation the question of large steamers being compelled to go up the narrow channels to Montreal was brought up, and the Montrealer expressed the view that if the day arrived that large vessels could not navigate the river up to Montreal, the shipping agents would prefer that they went to Portland than Quebec. Owing to the use of Portland in handling Canadian cargoes, the Montreal interests would still control the cargoes and the chartering while if Quebec was the port, it would mean that they would have to remove their offices and staffs from Montreal to Quebec to properly look after their interests.

The general feeling in Quebec is by no means adverse to the deep waterway scheme, to connect the Great Lakes with the St. Lawrence, and make possible the extension of the ocean shipping trade to the head of the Great Lakes. Quebec men with long experience well realize that if the deep waterway were to become a fait accompli, it would not in the least re-act against the shipping interest of the port of Quebec. On the other hand, it would be of benefit to the port, as all deep draught vessels would make Quebec their terminus. The Quebec Board of Trade when they passed a resolution endorsing the objections made to the deep waterway, and forwarded it to the Federal Government, did not voice the feeling of the shipping interests of Quebec. The Montreal Board of Trade is a large body of business men engaged in all branches of commerce. It is preponderately English speaking in composition, with men of wide vision, initiative and enterprise, who are devoting their time continually to the expansion of the commercial life of Montreal. They have a staff of permanent employees who take an interest in the work, and keep on planning the protection and progress of their city and port. Toronto, as far as we know possesses the same kind of personnel in its Board of Trade.

It has to be admitted that the city of Quebec is not so blest with a Board of Trade. Its membership numbers seven hundred, but the members take little or no interest in the essential business principles or meetings of the board. Without prejudice or disparagement to the composition of the Quebec Board of Trade, there is no denying the fact that the members lack initiative foresight and business vision that characterise the members and officers of the Montreal and Toronto boards. The writer must not be misunderstood in giving the following reasons:—the population in the present in comparison with the west, preponderately French Canadian. There are a few English speaking members, but these have no influence or weight, because the leading lights of commerce who are English speaking, take no interest whatever in the business of the board, and seldom or never attend the meetings. The result is that the French Canadian members of the Board are absolutely native in so far as their race and language are concerned, and consequently small in their ideas of true Canadianism. They are nevertheless good and honest men, filled with good meaning, but lacking in the vision of the English speaking membership of the Montreal and Toronto Boards of Trade, and thus allow the Montreal interests to beat them all the time.

In Montreal when a question arises affecting the trade interests of the city, the members of the Board of Trade sink all political, religious and racial differences, and co-operate for their mutual good and when they go to the government, which is frequently, they go in a compact body and generally get what they desire. In Quebec it is different; the French Canadian members are individualistic in their ideas and business relations, and if a question comes up before the board in which their personal interests are affected, they will be on hand to fight the matter to a finish, but if it is a question of public movement in which they are not directly interested, they will let it severely alone. They do not realize that any movement for the general public good will also be a benefit to them individually. Although it has been recognized for years that Quebec could have a cold storage plant for the storing of perishable food stuffs awaiting shipment, all the board ever does is to pass a resolution and send it to Ottawa, where it is duly pigeonholed in the same way that all communications have been dealt with for the last fifteen years.

Mr. T. M. Kirkwood, a former shipbuilder and for years a resident of Toronto, who is president of the St. Lawrence Transportation Co., which operates a line of tugs and freight barges between Montreal and Quebec, takes a great interest in the grain carrying trade. He has put an interesting proposition before the Canadian Government with the object of diverting the shipping of grain from American to Canadian ports. Mr. Kirkwood has been in England for some time, in search of a steamer to serve a special line of transportation between the Canadian Great Lakes and Quebec. He has written the following letter to the Minister of Marine and Fisheries, in which he calls attention to the losses sustained by the Canadian Government Merchant Marine, and the Canadian National Railways, and the 80 per cent. Canadian grain

shipped through American ports. Following is an extract from the letter:

"I am a shipbuilder and vessel owner. I build ships at Three Rivers for the Imperial Government and I have operated and am yet operating, vessels between Quebec and Montreal for some years. I bought a steamer here last April for the Quebec and Montreal route and have returned for another one.

I have talked with a strong group of financiers here with reference to taking over and operating all your Government Merchant Marine steamers, and they are inclined to form a large company to take over and operate the vessels and to build elevators in Quebec, Halifax, England, France and Italy, and a large flour mill at Quebec, providing you can induce your Government of Quebec or Ottawa to guarantee their interest on their issue of bonds and will sell the vessels at a fair price, and that your Ottawa Government will lower the rate on grain from Winnipeg to Quebec to 12 cents per bushel, and from Winnipeg to Halifax to eighteen cents per bushel and your Government to hold first mortgage and insurance on the vessels.

They propose to sell to the actual buyers of wheat and flour in England, France and Italy, so that the buyers will have their wheat and flour shipped on their own line of steamers. This will, of course, send to Quebec the 80 per cent tonnage that is now going via American ports for export to England, France and Italy. You can readily understand your Port of Quebec will be the headquarters for the large fleet of steamers and will get the 80 per cent. export tonnage because the grain will have to be shipped over the Transcontinental Railway, and the steamers at Quebec because the bond holders will be the buyers of the wheat, and will order it shipped to Quebec for export, or to be made into flour in their own mill at Quebec. You can understand that if a large mill is built at Quebec your Quebec farmers will get cheap bran and shorts for their cattle; this will enrich your province.

Kindly cable me what you think of the project at London and North Western Hotel, Liverpool."

Yours sincerely

(Signed) "T. M. Kirkwood."

Quebec is to be provided with a new Seamen's Institute. For some years past there has been two such shore homes at this port, one conducted by the English speaking people of the city, and non-sectarian in character and management. The other a fine building in Champlain street opposite the King's Wharf property, operated by the Catholic Church authorities, and altogether French Canadian and Catholic in its aspect, and as such rarely frequented by sailors engaged in the ocean trade. The other on the contrary is well patronised, and as the premises are small, the committee of management has appealed for funds to erect a new and suitable building. The appeal has been responded to by the English speaking merchants of Quebec, and the Quebec Harbor Commission, has decided to grant the necessary ground on the river front for the erection of the building. On July 12th a meeting of citizens was held in the office of Mr. John R. Ross, when a letter was read from Mr. Geo. M. Bosworth, president of the Canadian Pacific Steamship Lines, who offered on behalf of Mr. Beatty, President of the C. P. R., the sum of $5,000 toward the Institute. The building will cost about $70,000, and arrangements are now being made to proceed with the project.

Halifax Notes

During the past month there has been a slight improvement in shipping circles here. This is largely due to the shipment of lumber to the markets of the United Kingdom and also to the movement of refined sugar eastward across the Atlantic.

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A number of vessels, steam and sail, have taken cargoes of lumber from Halifax recently and there have been several large shipments of refined sugar. Thus the lumber export trade to the United Kingdom is reviving and it is expected that there will be a greater improvement within a short time.

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The repairs to the Norwegian steamer Sangstad, which stranded on Seal Island, near Yarmouth, last month, have been completed. Halifax Shipyards, Ltd., had the contract for replacing a large number of plates forward.

The Ketch-rigged vessel Albert, owned by the Arctic Gold Exploration Syndicate, London, Eng., left Halifax this month for Baffin Land, after taking all the supplies for the company's trading posts at this port. The Albert, which has been many years engaged in cruising to the far north, came to Halifax from Scotland to pick up the supplies. She is commanded by Captain John W. Murray, a veteran of the Arctic and will visit Cumberland Sound, Bond's Inlet and Cape Kater. When landing supplies she will pick up furs and other articles which the trading company's agents have gathered and will take them to Scotland.

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The appointment of William Duff, M. P., of Lunenburg as chairman of the Royal Commission appointed to investigate the fisheries in British Columbia, has met with favor in Nova Scotia. Mr. Duff is well versed in all matters relating to shipping and fisheries and may be depended upon to make a thorough survey on the Pacific.

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The trustees of the International schooner Trophy and the members of the American Race Committee are to meet at Portland, Me., about July 22 to complete arrangements for this year's contest. It is expected that the question of the eligibility of the schooner Mayflower, barred from last year's contest, will be one of the chief matters up for discussion.

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Latest reports from the Lunenburg Banking fleet indicate that the Grand Banks fishery has been a failure to date. While some of the fleet report fair-sized fares the majority have had little success. Similiar reports have come from units of the American fleet and also from Newfoundland. It is said that the vessels which were fishing on the eastern part of the Banks were out of luck while those who remained on the western grounds were fairly successful.

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Reports from Northern Cape Breton are to the effect that the lobster fishermen there have had a most successful season to date. The season closed on July 15 and several boats had catches amounting to 12,000 pounds.

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While enroute from Turks Island to Lunenburg the Lunenburg three-sticker Integral, Captain S. E. Himmelman, had her canvas badly torn when she encountered a series of strong gales. The Integral brought a cargo of salt.

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The summer cruises to the Saguenay, which are maintained by Furness Withy and Company, are being made this year by the steamer Fort Hamilton. She left New York on July 8 on her first cruise and will make three others. The steamer calls at Halifax both enroute to and from Saguenay and also spends two days at Quebec.

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Ships of the North Atlantic Squadron are to be in Halifax from August 24 to September 1. They will include H. M. S. Raleigh, Admiral Pakenham's flagship. A United States squadron, on which some two thousand midshipmen in training at Annapolis are making their annual summer's cruise, will be here the first two weeks of August. During their stay a carnival week is being staged.

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The Silvia, recently purchased by the Red Cross Line for their Halifax-New York-St. John's service arrived on this side of the Atlantic early this month and started her schedule from New York on July 22. Larger than the Rosalind, which has been on this service for the past three years, the Sil-

via is strongly built for the ice conditions and her passenger accommodations are superb.

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The ice menace on the Grand Banks this year was greater than for many seasons and the patrol maintained by the United States and which the new U. S. cutters Modoc and Tampa were engaged in, was continued until after July 15. A large number of bergs made their way south this spring and up to this month they were still reported drifting southward.

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The LaHave schooner Win-the-War was lost at Bon Partridge Island, near Yarmouth, early this month. She was bound to Lunenburg for repairs after which she was chartered to load at Bridgewater.

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Among the other mishaps of the month was the stranding of the tern schooner Marion L. Conrad, molasses laden from Barbados for Bathurst, N. B., on July 13 as she was leaving Lunenburg to resume her voyage. She was refloated and towed back to Lunenburg.

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On July 1 Commander Shenton, who for several years was in charge of the dockyard at Halifax, relinquished his post and was the recipient of many presentations. R. H. Wood, formerly engineer manager, is now in charge of the yard.

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H. M. C. S. Aurora and the two submarines were laid up at Halifax recently and their crews paid off. About two hundred returned to England while others took their discharge and will locate in Canada. A small number were transferred to the destroyers Patriot and Patrician.

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Two towboats were lost during the past month. The Mary Battle, owned by the Reid Wrecking Company, was wrecked on the Gaspe coast while enroute from Halifax to Sarnia, Ont., and the Lillie, owned by Hendry, Ltd., Halifax, was burned off Shippegan, N. B.

St. John N .B.

A few cargoes of lumber by sailing vessels have been moving recently.

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The steamer Katanga, Captain L. A. Johnston, arrived in port, July fifteenth, from Swansea, with a cargo of 2,988 tons of anthracite coal for account of the Consumers Coal Co. This is the first shipment of its kind for this port for some years.

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The firm of Nagle & Wigmore have taken over the business of the International Mercantile Marine lines as general passenger and freight agents for New Brunswick. The business of this line includes the White Star Dominion line and its subsidiary lines.

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The Canadian Pacific steamer Sicilian has been withdrawn from the St. John-Havana service and returned to England June twenty-second.

It is reported that the freights during the summer would not warrant the service. However the service will be resumed next winter.

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There was very little activity in the port of St. John during the month of June and the present month is not promising, outside of the regular sailings of the Royal Mail Steam Packet Co. steamers fortnightly and the few import and export sugar steamers, for on account of the local refineries there has been very little business done on the water front in the line of steamers.

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Mr. Harold E. Kane who has been port agent for the Canadian Government Merchant Marine for nearly three years, has resigned his position to become a member of the firm of Nagle & Wigmore. He will be in charge of the International Mercantile Marine end of the business.

The resignation will take effect the end of this month and Mr. W. G. Miller, who is chief clerk here during the winter port season, will assume charge of the business of the C. G. M. M. here until a new port agent is appointed.

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The Gloucester schooner "Puritan," prospective challenger for International Fishermen's race, ran on a bar about two miles north of the northwest station on Sable Island, early on the evening of June 23.

Captain J. R. Thomas advised that on account of the enormous momentum, the schooner ploughed a considerable distance through the bar and it was thought she might work her way through at the moment but she slowly came to a stop when huge seas came hurtling aboard and battered her to pieces.

Three of the dories reached shore and the balance of crew, namely, fifteen members, were picked up by the fishing schooner Coral Spray, who landed the rescued men at Pleasantville, on the La Have river.

A WONDERFUL ENGINE INDICATOR

Engineers have the greatest possible regard for the simple indicator which has been used for so many, many years to reveal what is happening inside the cylinder of a steam engine. The indicator diagram of an engine is the recognized certificate of character. This standard instrument, however, is not exempt from the law of process, and at a recent meeting of the Royal Society of Great Britain an instrument was shown which quite puts the old-fashioned indicator in the shade. This instrument will, within half a minute and almost automatically, produce ten successive permanent records of the performance of a high speed engine. It traces these records on a card which is ready either for immediate inspection and measurement in a very simple microscope or for photographic enlargement. The value of such records taken at such rapid intervals is that they draw the attention of the designer or manufacturer to unsuspected or obscure defects which would not be revealed by the ordinary indicator. The new indicator can be used on motor cars and on flying machines when track tests or trial flights are being conducted and where there is neither space or time for elaborate instruments or methods of testing. The records are mechanical, not optical or photographic, and the operator need not leave his seat in order to take them.

New York:—The "Mauretania" on a recent trip from New York to Southampton, calling at Cherbourg on the way, set up two new world's records. She made the passage to Cherbourg in 5 days, 8 hours, 10 minutes, beating the previous record held by the Kaiser Wilhelm Der Grosse of 5 days, 16 hours. The "Mauretania" docked at Southampton just eight hours after leaving Cherbourg, making the total time 5 days, 16 hours, 10 minutes, against the 5 days, 17 hours, 8 minutes of the "Kaiser Wilhelm der Grosse."

THE LATE MR. JAMES BAIN

The death has to be recorded of Mr. James Bain, superintendent engineer for more than thirty years of the Cunard Steamship Company. Mr. Bain was born in 1841, and was a son of an engineer who had worked under Sir Robert Napier. He himself served his apprenticeship under Sir Robert at the famous yard on the Clyde. After his training on shore he proceeded to sea as an engineer in the Cunard Line, and subsequently in the White Star Line. In 1876 he was appointed a surveyor for Lloyds, and ten years later he rejoined the Cunard Line in the capacity of superintendent engineer, a post which he continued to hold until he retired a few years ago from active service. During the course of his services with the Cunard Company, he witnessed and assisted in many marine engineering developments. His first duty as superintendent engineer consisted of preparing the Etruria for her maiden voyaage to America. From that time onward he was intimately associated with all the developments in the way of improved propulsive machinery which are historically associated with the vessels of the Cunard Line.

THE advent of the new Canadian Pacific liners, Empress of Canada and Empress of Australia, to Pacific waters will probably result in action by the principal Japanese shipping companies towards building up their passenger fleets by the acquisition of larger and faster vessels.

During a comparatively brief span of years the Pacific has witnessed a tremendous growth in the tonnage of the passenger fleets, especially as regards the steamships plying from the Orient to British Columbia and Puget Sound ports. Before the war the Canadian Pacific operated only the Empress of Japan, Empress of China and Empress of India, old-type vessels, with a gross tonnage of less than 6,000 each. Now the company is operating the Empress of Russia and Empress of Asia, both of 16,000 tons, and the new Empress of Canada and Empress of Australia of 21,000 tons each. Instead of 18,000 tons, the company is now operating an aggregate of 74,000 tons, or more than four times as much. The Japanese lines, the Nippon Yusen Kaisha and the Osaka Shoshen Kaisha, have increased the tonnage of their fleets to almost the same extent, and the Admiral Line, the American concern with headquarters in Seattle, is steadily strengthening itself and to-day is running five steamships of about 15,000 tons in the trans-Pacific trade.

The Admiral Line recently inaugurated a service to California, advertised as the fastest coastwise service in the world, the steamship H. F. Alexander, formerly the Great Northern and the U.S.S. Columbia during the war, flagship of the American Atlantic fleet, making the run between San Francisco and Seattle and Tacoma, calling at Victoria, in thirty-nine hours. The Admiral Line has been operating the steamships President and Governor in that service for years, but is now better fortified than ever.

The three 3,500-ton steamships being operated between British Columbia and California by the Canadian Government Merchant Marine are among those which will be sold if the annual report of the organization, presented in the House of Commons recently, is adopted. The Canadian Rover, Canadian Observer and Canadian Farmer are the vessels.

As a result of all these developments the Japanese lines are beginning to feel that in order to hold their trade they must not only increase their tonnage, but assign better class steamships and faster to the trans-Pacific route. The Nippon Yusen Kaisha recently withdrew its largest vessels for the European run on account of the general depression in business. Dr. H. Fujishima, a director of the Nippon Yusen Kaisha, recently passed through Victoria and stated that his company was preparing to build at least three new steamships which would compare in size and speed very favorably with the Canadian and American vessels now in the passenger service. The new vessels will be built in Japanese yards. As soon as the present revival in business to European ports commences to show a decline the Nippon Yusen Kaisha as well as the other big carrier, the Osaka Shoshen Kaisha, will probably transfer some of the better vessels to the Pacific again.

Freight rates on Pacific steamships are still without definite regulation as between the various operating companies. Several attempts have been made to bring about a conference agreement as to a rate schedule, but nothing of a tangible nature has so far been done. The Japanese companies, which have felt the conditions in a more severe manner than the others, are taking the lead and the Canadian Pacific is said to be ready to join with them. The Admiral Line, which operates on the basis that all losses are assumed by the United States Shipping Board, has shown some hesitancy in joining the conferences and so has the Robert Dollar Company, but the Blue Funnel Line (Holt) has persistently refused to consider a rate agreement.

Montreal and Quebec are making determined efforts to weaken Vancouver's competition as a grain port and Montreal has adopted regulations permitting the loading of bulk grain in the lower hold and 'tween decks of three-deck vessels. Formerly the 'tween decks were reserved for sack grain at the Eastern ports, although Vancouver long ago waived that restriction. The Quebec harbor commission has decided to waive tonnage dues of seven cents per net registered ton, also side mooring of sixty cents per hundred tons net register on steamers loading full cargoes of grain at Quebec. Retaliatory measures are now being considered by the Vancouver authorities.

Tenders submitted to the Victoria office of the Federal Department of Marine for the purchase of two uncompleted barquentine hulls now in the stocks at the Cholberg Shipyards, Victoria, have been forwarded to Ottawa, where announcement will be made of the successful bidder. The hulls were to be built by the Cholberg yard for the Victoria Shipowners Ltd., but the enterprise proved ill-fated and the government took over the vessels, for whose construction it had made loans up to about 70 per cent. of the total capital. It is understood that the tenders were very low indeed, but it is expected that the government will accept the best figure offered, as the only alternative would be to complete the ships, and that is the last thing the government appears to want to do, owing to the prevailing market for wooden ships.

The Transoceanic Line, operating a fleet of steamers to the United Kingdom and Scandinavian ports, from this coast. If the business is sufficient to make operation worth while, the steamship Brielle will inaugurate the service late in July, followed by the Kristianafjord late in August, the steamship Fogner being booked for September sailing. The Empire Shipping Company, Vancouver, will represent the company on this coast. London, Hull, Leith and Christiania are given as the European ports to be served.

The Canadian Pacific freighter Methven, formerly operated in the trans-Pacific service, is now to be operated on the Atlantic. Late reports gave her location as New York, having steamed through the Suez Canal. She is to go from New York to Philadelphia and Hamilton Roads to bunker and then to Jamaica, where she will load sugar for Montreal. With the new liners Empress of Canada, and Empress of Australia in service, as well as the other big ships, Empress of Russia and Empress of Asia, the Canadian Pacific is well fortified on the Pacific and the smaller and older vessels, such as the Methven, Monteagle and Empress of Japan, are being placed in service elsewhere.

Montreal Notes

Officials of Canadian steamship companies in Toronto did not wish to comment on the intimation recently received from Ottawa that the Canadian Government might throw open Canadian port-to-port traffic to United States vessels by a suspension of the coast laws because of alleged discrimination by Canadian vessel owners. These gentlemen declined to be quoted personally. However, they stated that no matter what tonnage was available the movement of grain to the Liverpool market was governed by the handling facilities of the port of Montreal which are limited to a million bushels a day, provided there is ocean space equal to the requirement ready to be loaded. Montreal is stated to be the neck of the bottle. Early in July there were 32 canal carriers from Port Colborne waiting to be unloaded there. Last week there were 45 and vessel movements indicate that an equal number will be tied up at Montreal awaiting unloading before another week has past.

The lower rate to Buffalo of 2 cents compared with the Port Colborne rate of 3 cents, it is stated, was caused by unusual conditions in the United States lake traffic. The United States owners anticipated an early movement of ore from Lake Superior port to Buffalo and started their boats for the head of the lake at the opening of navigation. The ore movement did not develop because the Inter-State Commerce Commission had not fixed the rail rate on the haul from the mines to the Lake Superior ports, and from Lake Erie to the smelting district. No shippers would move ore until these rates were fixed. This reduced rail rate only became effective about the middle of June and until that time the United States lake carriers could not remain idle so went into the grain trade. This competition reduced the rate to Buffalo from 2½ cents to 2 cents. The Buffalo rate has gone back to 2½ cents and is expected to go higher as the requirements of the Pittsburg district furnaces increase. In fact, it is stated that the season will call for the movement of 45,000,000 tons of ore which will require all the available United States tonnage for the balance of the season. Probably another of the reasons which tended to lower rates in the United States was the lack of northbound coal cargoes owing to the anthracite miners' strike.

When the matter was brought before the attention of Mr. Fennell, general manager of the Port of Montreal, he stated that it is quite true that Montreal is the neck of the bottle but the neck of the bottle cannot put through much unless there is something at the other end which is operating. Mr. Fennel further stated that there must be the ocean bottoms available. "Here in Montreal it is quite correct that the handling facilities are about one million bushels a day on the average, but the output would be one and one-quarter or one and one-half million bushels really, if we could get ocean tonnage to take it. That, however, cannot be regulated like a railway train for there are such things as fog, ice and other conditions which effect the tonnage question, but the business is being handled just as well as is humanly possible." With regard to waiting vessels, Mr. Fennell points out that on July 6 there were only 4 vessels waiting. On July 8th there were 13 and the number has occasionally of late crept up to 27. The capacity of the port for unloading, is 9 vessels per day which means that there was at no time recently more than three days' work ahead of the port to clear up.

Mr. Fennel admits that early in the season there were 45 vesels on hand but they had coped with the situation and had managed to reduce same to the smaller figures mentioned above, and added that the congestion which occurred earlier in the season was due to the Port Colborne situation. to which grain was being carried from the head of the lakes quicker than it could be brought down to Montreal with return of the lake carriers. But even that situation seems to have been solved by the Grain Board.

Mr. Fennell has not received any communication from Ottawa concerning the possibilities of the suspension of the coast laws but he pointed out that virtually these laws designed to protect Canadian inland shipping were being frustrated daily by American shipping.

"CAIRNDHU AND SPRAY

The inquiry into the collision between the tug "Spray" and the Cairn-Thompson freighter "Cairndhu" was completed on July 18th. It was found that the tug acted in a very inexcusable manner, and that there was a certain lack of seamanship and judgment on board the freighter. Six lives were lost on the tug. The collision occurred in the early morning of July 1st. A very lengthy inquiry was held, the result of which is contained in the following finding handed down by the court,

The Finding

"The court having carefully weighed the evidence adduced, for the reasons rather lengthily given in the summary, finds the steam tug 'Spray' of the Sincennes-McNaughton Line, chiefly to blame, through inviting the collision by an inexcusable manoeuvre, and the master, Napoleon Mongeau, culpable of negligence, and his certificate is suspended for a period of twelve months, from July 18th, 1922, to July 17th, 1923.

"Captain W. Whitehead, of the S. S. 'Cairndhu,' Board of Trade Certificate No. 041101, is exonerated from blame.

"Thomas D. Healy, Second Officer of the S. S. 'Cairndhu,' Board of Trade Certificate No. 0001471, is found in default, and his certificate is suspended for a period of six months.

"As his certificate was returned to him principally in order not to cause any delay in the departure of the S. S. 'Cairndhu,' and in view of the indefinite adjournment of the case then in contemplation, hence the court orders that the agents or owners of the vessel take steps to have this certificate returned to the court. The suspension will date from the time it is delivered to the agents or owners of the S. S. 'Cairnhu,' when it is to be mailed directly under registered cover to the Dominion Wreck Commissioner at Ottawa.

"The pilot, E. A. Paquin, of the S. S. 'Cairndhu,' is found in default and his license is suspended for a period of six months from July 18th, 1922, to January 18th, 1923.

"In meeting out such light penalties considering the gravity of the casualty, the court has borne in mind the peculiar and inexcusable action of the 'Spray.'

"This tribunal individually and collectively, feels keenly the loss of life and wishes to express and extend to each relative of the deceased members of the tug 'Spray,' its deepest sympathy.

"It also wishes to thank counsel representing the various interests for their able arguments, which have considerably helped the court to arrive at a conclusion and a conscientious interpretation of the duties of each person involved in this casualty, also that of the articles of the Rules of the Road, 22, 25, 27 and 28 in the case of the 'Spray' and Articles 27, 28 and 29 with regard to the "Cairndhu."

Read in open court at Montreal, P. Q., at 4.30 p. m. this 18th day of July, 1922.

Sgd. L. A. DEMERS

Dominion Wreck Commissioner.

Concurred in by

"Sgd. CHARLES LAPIERRE,

"Sgd. J. BLANCHARD HENRY,

Nautical Assessors.

The investigation was presided over by Captain Demers, Dominion Wreck Commissioners, assisted by Captain J. Blanchard Henry and Captain Charles Lapierre, acting as Nautical Assessors.

Messrs. W. L. Bond, K. C.; A. R. Holden, K. C.; and Lucien Beauregard, appeared for the ss. "Cairndhu" and her owners.

Messrs. Aime Geoffrion, K. C.; P. St. Germain, K. C.; and B. P. Raymond, for the tug "Spray," her owners and masters.

Mr. R. T. Heneker, K. C., represented the master and second officer of the ss. "Cairndhu" on behalf of the Imperial Merchant Service Guild.

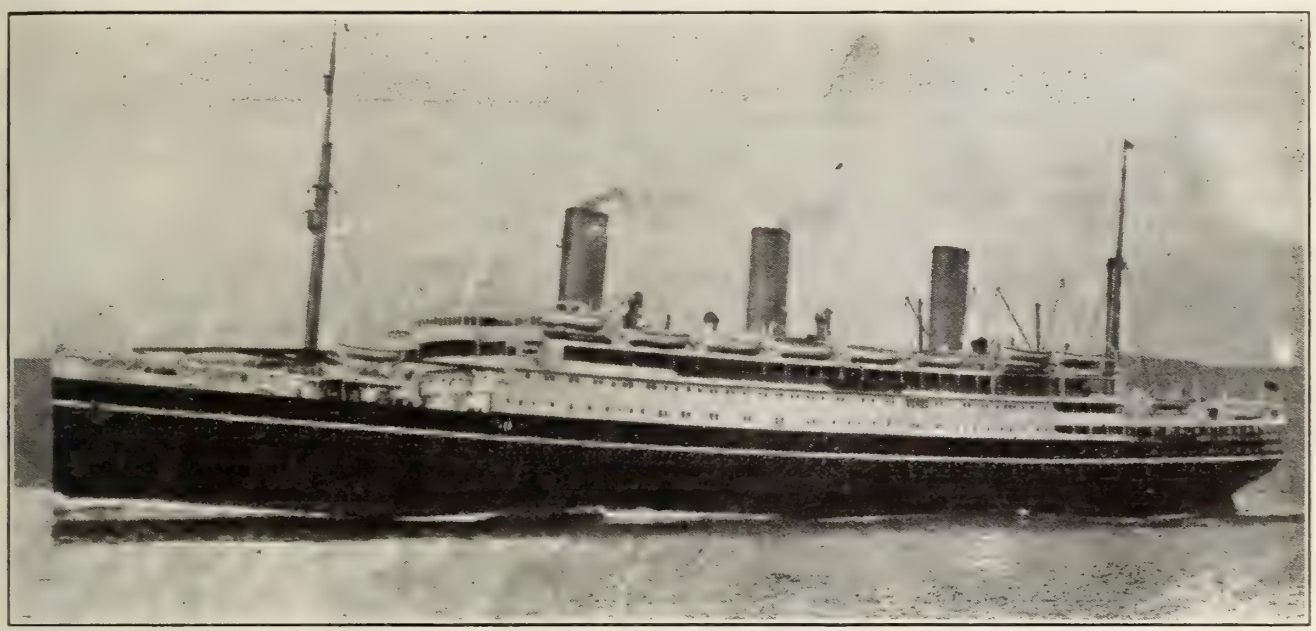
Mr. Thomas Vien, K. C., M. P., represented the pilot of the ss. "Cairndhu."

The Pacific is attracting thousands of tourists this year who formerly spent their vacations in touring Europe, according to P. D. Sutherland, Canadian Pacific general agent at Hongkong, who passed through on his way to Montreal a few days ago.

Latest Movements of the C. G. M. M.

Steamer and Voyage	Sailed From	Arrived At	Sailed From	Arrived At	Routed
Aviator (14)	Montreal June 16	London July 10			Montreal-Quebec-Halifax-London-Swansea
Beaver (13)	Montreal June 8		St. Vincent July 11		Montreal-Barbados-Trinidad-Demerara-St. Vincent Montreal.
Britisher (2)	V'nc'uver June 12	Sydney July 14			Vancouver-Sydney-Melbourne-Adelaide
Carrier (8)	Montreal June 21	Cardiff July 12			Montreal-Swansea-Cardiff.
Challenger (4)	Montreal July 16	Psd. Father Point July 16			Montreal-Sydney-Antwerp-London.
Coaster (8)	Montreal July 6	No.Syd'y July 9	No.Syd'y July 10		Montreal-Barbados-Trinidad-Demerara.
Commander (8)	Montreal June 29	Plate Point July 3		St. Pierre July 16	Montreal-Antwerp-London.
Conqueror (7)	Montreal June 23	Campbt'n June 26	Camp'n July 12	Psd.C.Race July 14	Montreal-Campbellton-Dublin-Manchester.
C'nstruct'r (1)	Halifax Feb. 2	Auckl'nd June 11	Auckl'nd June 15		Halifax-New York-New Zealand-Australia.
Cruiser (2)				Montreal July 12	
Explorer (5)				Montreal July 16	
Farmer (18)				Vancouver	
Fisher (13)	Montreal June 22		Kingston July 15	July 12	Montreal-Bermuda-Nassau-Kingston-Belize-Montreal.
Forester (13)	Montreal July 13	Psd. Canso July 16			Montreal-Bermuda-Nassau-Kingston-Belize-Montreal.
Freighter (3)	V'nc'uver June 22	Yokohama July 11			Vancouver-Yokohama.
Harvester (8)	Montreal June 21	Deme'ra July 8	Deme'ra July 12		Montreal-Barbados-Trinidad-Demerara-Montreal.
Harvester (8)	Trinidad July 14	Trinidad July 16			Montreal-Barbados-Trinidad-Demerara-Montreal.
Highlander (5)	V'nc'uver May 31	Sydney July 12			Vancouver-Victoria-Honolulu-Auckland-Sydney.
Hunter (10)	Montreal		Valencia July 1		Montreal-Genoa-Messina-San Feliu-Valencia.
Importer (6)	Vancouver June 13		Miike July 9		Vancouver-Bombay.
Inventor (5)	Vancouver June 2		Kobe July 4		Vancouver-Victoria-Yokohama-Kobe.
Leader (3)	Halifax Apr. 29	Bluff July 16			Halifax-Norfolk-Australia-New Zealand.
Logger (5)				Montreal July 9	
Mariner (7)	Montreal July 6	St.Anne des Monts July 8			Montreal-St. Anne des Monts-Martin River-West Coast Britain-Liverpool.
Miller (11)	Halifax Feb. 28	Papeete July 2	Papeete July 6		Halifax-New York-Australia-New Zealand-Rarotonga-Papeete-New York-Montreal.
Navigator (16)	Montreal July 8	Psd.Cape Race July 12			Montreal-Glasgow-Swansea.
Observer (20)	Vancouver July 7		OceanFalls July 11		Vancouver-Blaineys-Nanaimo-Ocean Falls.
Otter (9)	Montreal May 23	Swansea June 25	Swansea July 6		Montreal-Campbellton-Waterford-Cardiff-Swansea.
Pioneer (1)				Montreal July 9	
Planter (5)	Montreal May 31	Panama June 17	Colon June 18		Montreal-Sydney-Australia-New Zealand.
Prospector (7)	V'nc'uver June 12	Chemianus July 14			Vancouver-Port Alberni-Portland-Nanaimo-Chemianus.
Ranger (16)	Montreal June 2	Birkenhead July 12			Montreal-Quebec-New Richmond-Preston-Liverpool.
Rover (16)	V'nc'uver June 28	SanFrancisco July 13			Vancouver-Blaineys-Nanaimo-Ocean Falls-Astoria-San Francisco.
Runner (10)	Montreal June 23	Glasgow July 13			Montreal-Campbellton-Glasgow.
Sapper (27)	Montreal July 7	St.Johns July 13	St.Johns July 14		Montreal-Charlottetown-St. John's-Montreal.
Scottish (2)	V'nc'uver Mar. 9	Sydney June 22	Sydney June 24		Vancouver-Australia-New Zealand-Moji-Yokohama.
Seigneur (13)	Halifax Apr. 6	Brisbane July 4	Brisbane July 11		Halifax-New York-New Zealand-Australia-New York
Skirmisher (3)	Vancouver July 13				Vancouver-Sydney-Melbourne-Adelaide.
Spinner (7)	Halifax Jan. 13	Panama July 14	Colon July 14		Halifax-New York-New Zealand-Australia-New York-Montreal.
Squattor (9	Montreal June 1	Dublin July 14			Montreal-Nelson-Dublin-Manchester-Glasgow.
Transp'ter (2)	V'nc'uver Apr. 14	Newc'tle June 26	Newc'tle July 7		Vancouver-Auckland-Wellington-Sydney-Melbourne-Adelaide-Newcastle-San Francisco.
Traveller (4)	V'nc'uver July 13	Esquimalt July 14			Vancouver-Esquimalt.
Victor (8)	Montreal July 4	Sydney July 7	Sydney July 10		Montreal-Australia New Zealand.
Volunteer (13)				Montreal July 14	
Winner (5)	V'nc'uver May 8	SanFranc. July 12	Frisco Juyl 13		Vancouver-Yokohama-Shanghai-Takubar.
Tolmie (2)	Vancouver July 10				Vancouver-Australia.
Ranger (12)				Montreal May 10	
Rancher (9)				Montreal May 17	
Trapper (12)				Montreal June 23	
Trooper (14)				Montreal July 9	
Adv't'rer (11)				Midland Apr. 23	
Engineer (2)				Goderich Dec. 3	
Pathfinder (2)				Midland Dec. 4	
Sailor (17)				Goderich Dec. 4	
Sower (11)				Midland Dec. 6	
Trader (13)				Midland Dec. 4	
Drummond (7)				Collingwood June 9	
McKee (4)				Goderich Dec. 12	
Gunner (10)				Halifax Jan. 20	
Miner (18)				Halifax Nov. 25	
Sealer (14)				Halifax Dec. 29	
Settler (11)				Halifax Jan. 13	
Signaller (8)				Halifax Jan. 18	
Voyageur (12)				Halifax Dec. 15	
Warrior (9)				Halifax Jan. 19	
Sheba (3)				Halifax Dec. 3	

C.P.S. Liner "Empress of Australia"



The Canadian Pacific Steamships Liner, "Empress of Australia."

The latest addition to the Pacific service of the Canadian Pacific Steamships is the "Empress of Australia," a vessel similar in many respects to the "Empress of Canada," recently completed by the Fairfield Shipbuilding Co., and they are the largest and finest of the company's fleet.

The "Empress of Australia" was originally named the "Tirpitz" by her German owners, for she is one of the vessels taken over from the German merchant fleet at the end of hostilities. She was intended for the South American service of the Hamburg-American Line, and was launched in 1913 by the Vulcan Works at Stettin. Although launched before the war, the delays incident to that catastrophe prevented her completion until 1921, when she was handed over to the British through the Reparation Commission. Since being acquired by the Canadian Pacific Steamships she has been altered and overhauled, and fitted with oil burning furnaces. The alterations have been in the nature of interior changes, including the provision of accommodation for Asiatic steerage passengers. The lifeboat equipment has been brought up to date and Welin launching gear fitted.

Principal Dimensions

Length between perpendiculars 588 feet; breadth 75 feet; depth to upper deck 46 feet 2¾ in.; gross tonnage 21,500. She has accommodation for 400 first class, 165 second class, 360 third class, and 670 Asiatic steerage passengers, and carries a crew of 520. She is of shelter deck type, with a continuous bridge deck extending the full length of the ship. Above the bridge deck are upper and lower promenade decks running about half the length of the vessel, and the boat deck is above the upper promenade deck. Below she has two complete 'tween decks, while at the forward end she has a lower and orlop and at the after end a lower deck only.

The "Empress of Australia" is fitted with every safety appliance necessary to guard against unforeseen accidents. She has a cellular double bottom running almost the complete length of the ship, and is subdivided into watertight compartments in a very complete manner. The watertight doors are all arranged for hydraulic as well as hand manipulation. Wireless of course plays an important part in the ship's routine, direction finding instruments for ascertaining the ship's position by wireless are included, and there is an emergency plant as well as the main set. The vessel has a gyrostatic compass, and a submarine signalling outfit.

The Propelling Machinery

The propelling machinery consists of high speed turbines driving twin propellers through Fottinger hydraulic transformers. The main turbines are of the Parson's type with two Curtis impulse wheels, and the total power developed is 18,000 at the shaft, giving a speed of about 17 knots under normal draught conditions.

The turbines run at 800 revolutions per minute, the propeller speed being reduced through the transformers to 150 r.p.m. The ordinary thrust blocks were originally fitted, but these have been replaced with the Michell thrust block with independent forced lubrication. For reversing purposes a reversing engine is fitted to the end turbine, which shuts off the steam to the turbine, operates the pumps for the transformer circuits, and opens the steam when the turbine is running in the reversed direction.

For the ship's lighting and auxiliary purposes, four turbo generators are fitted, each of 115 kilo watts capacity running at 2,200 r.p.m. The boilers which were built in Germany at the Vulcan Works, are a water tube type, similar to the Yarrow, and working at 250 lbs. per sq. inch. There are fourteen of them, in two boiler rooms, each boiler having three furnaces. Howden's forced draft is used.

The passenger accommodation is very sumptuously fitted up, with elevators running between main and promenade decks, smoke rooms, ladies' room, writing room and the usual lounges among the public rooms. The first class dining room can accommodate 370 passengers at one sitting. The vessel will be a decided acquisition to the travelling public between the British Columbia coast and the Far East.

Although the Federal Government has agreed to proceed with construction of the Esquimalt drydock, progress was held up for a few days as a result of a threatened strike of steam shovel operators, who held out for $200 a month wage, as against $190 formerly paid. The trouble has now been settled and work is proceding.

Current News of The Ancient Colony

Special To "Canadian Shipping"

THERE is more romance, hazard and adventure surounding the prosecution of the Newfoundland sealing industry, than around any other sea fishery in which the hardy mariners of the ancient colony engage. Of but little more than six weeks duration, it calls for all the hardihood, skill and courage on the part of both captains and crews of ships engaged, for the success of the venture depends on victory over the elemental forces of nature, the conquest of ocean blizzards, grinding ice floes, storm and tempest, and winning the dicing with fortune in the face of vicissitudes which few citizens of the world, other than Newfoundlanders, have been compelled to engage in. But to the hardy seamen of Terra Nova it is all in the day's work. The months of March and April find them lined in mortal combat with Arctic tempests and splintering icefields, in an endeavor to wrest from the frozen ocean the wealth that goes to start them on the way of their year's earnings. And, as a rule they win out. There is no surrender once the sealing fleet makes steam and putts forth from port in the annual quest of the hair seal. Grit and endurance, stubbornness and determination, the desire to kill a load, and be first back to port; all these sway the men who comprise the crews of the ships that go forth to battle with the unleashed forces of the North in their quest for wealth, and who invariably return victors.

An Unique Industry

Far back as the year 1790 it was recognized that much wealth could be brought to Newfoundland through the prosecution of the sealing industry, and in those days those who saw possibilities in the venture were not slow to take advantage of them. A fleet of sailing ships engaged in the voyage sailing from various ports, either for the North-Eastern front of the island or the Gulf of St. Lawrence, in the early days of March, and from the year mentioned till the advent of steam in the fishery, sailing vessels, of all rigs, successfuly and profitably kept up the fishery. With the coming of steam, about the middle of the last century, craft propelled by sail were gradually squeezed out, and where once hundreds of these, with crews comprising thousands, made picturesque departures from port, amidst the cheers and musketry salvoes, to-day the sailing fleet may not be considered as even a negligible quantity, three or four small fore-and-afters being all that are left of a majestic and dignified squadron. And even the number of steamers has been reduced. Where once a fleet sailed, there is now only a flotilla, nine ships (screw) only having last March gone in quest of the "whitecoat." The diminution in the steam sealers has been due to loss "at the ice," as the sealing voyage is locally known, and the unwillingness of operators to replace them. Eventually the steam sealers will be a thing of the past, but whether the sailing fleet will return is a debatable matter at the moment.

A Source of Wealth

There are two varieties of Newfoundland seals, the "harps" and the "hoods." The former take their names from the fact that upon their back they have a distinct marking in darker color than the surrounding hair "approximating in the shape of an Irish harp." The male "hoods" are identified by a bladder-shaped bag which can be expanded at will to cover the nose and face for protection or when fighting, for it must be noted that seals are great "scrappers." Harp seals are smaller than hoods and more numerous. An old harp at maturity will weight about three quintals, 336 pounds. Old hoods double that weight. During summer the seal herds are distributed along the coasts of Greenland and Labrador: the harps in the west, the hoods on the east side. They are usually found in pairs, and it is not until towards the end of the Arctic summer that they gather in herds for the annual southerly migration. At the time named a body of ice, from five hundred to one thousand miles square, is released and carried slowly southward by the Arctic currents until it disappears in the warmer waters of the Gulf Stream. When this huge area of ice begins its journey southward, the seals disperse and are lost to sight until toward the month of January, when they assemble in southern waters for their return journey to Northern seas. On this return they travel toward the northeast coast of Newfoundand, and there meet the ice floe released during the previous summer, and in almost the same latitude each year, about the month of March. The Newfoundland seal is the hair seal, and must not be confused with the fur seal from which sealskin coats of ladies are made. The skin of the Newfoundland seal makes a quality of fine leather, and is largely used in the manufacture of fancy bags, belts, purses, cigar and cigarette cases and many other personal articles. It is from the oil that the greatest value accrues, its extreme purity being due to the fact that it is mostly extracted from the fat of young seals. which are fed on their mother's milk exclusively.

Only nine steamers prosecuted the voyage of 1922. Eight of these operated on March 8th from St. John's, i.e., the northeast coast, the other in the Gulf of St. Lawrence. These all sailed on March 8th from St. John's. The reduction in numbers from former years is due to losses among the fleet and sale of some of the ships comprising it to various scientific societies which use them for polar exploration work. Last season saw the smallest number ever clearing for the frozen pans with the exception of 1921, when a similar fleet went after the fat. One ship, S. S. "Diana" as already reported in Canadian Shipping (April issue) was lost. The following descriptian of the voyage is taken from "Chafe's Sealing Report," a most invaluable recapitulation, year by year in this fishery.

"The steamers would have sailed a day or two earlier but were held up by the marine engineers going on strike. March 11th Neptune was 40 miles N. E. of Funks, with Thetis, Diana, Eagle, Sagona and Terra Nova 10 miles astern steering N. N. E.

March 12th "Diana," Captain John Parsons, struck old seals 60 miles E. of Funks with 5 ships in sight. Seal and Ranger not reported. March 13th Diana took 1,000 whitecoats and the Terra Nova 30, with Thetis alongside East of Funks.

On March 15th the seals were struck by Diana, Terra Nova, Thetis, Eagle, Neptune and Sagona from 5 miles east to 10 miles southwest of Funks from which about 70,000 were taken.

The "Diana" killed and panned 7,000 and on the 16th the ship behind jammed all day and while endeavoring to get clear lost her tail shaft. She was abandoned on March 27th about 100 miles S. E. of Cape Bonavista. The crew of 125 men was taken off her by the S. S. Sagona, Captain Job Knee and landed at Old Perlican.

In 1892 "Capt. Wm. Barbour" brought in one of the most valuable lot of seals in S. S. Diana (in two trips) ever landed by one steamer in one year, $106,-148.06. Crew of 224 men shared each $184.30. The Diana, formerly "Hector" in her 51 Springs brought in 546,842 seals.

March 16th Major S. Cotton and his mechanic, J. R. Stannard, in the "Martynsyde Airplane" and Capt. V. Sydney Bennett with Mr. Butler and wireless operator Heath in the "Westland" left Botwood at 11 a. m. to locate the seals, the planes passed over the sealing steamers at 12.20 p. m. The "Westland" returned to Fogo and Major Cotton made an extended patrol, and large patches of seals were seen by him sufficient to load all the ships.

March 17th Major Cotton again made a survey over the icefield and reported ships jammed, and that the seals lay to the eastward of them.

Parties directly interested in the venture, took quite a time to decide what they would pay Major Cotton for his information, in the meantime the ice and seals were driven a considerable distance when the arrangement had been finalized and the ships wirelessed the position of the seas, needless to say they could not be located where first seen.

Major Cotton was prepared again to locate the seals but the ice was from 50 to 60 miles off shore and the remuneration for his services was not sufficient to warrant his flying again.

March 25th to April 1st the Neptune, Thetis, Seal, Eagle, Rangor and Terra Nova were picking up seals 80 to 150 miles S. E. of Cape Bonavista.

The auxiliary schooner F. P. U., Captain D. White, sailed from Port Union for the icefields March 15th and arrived at Port Union on March 28th with 1,564 prime seals.

Newfoundland should send out 500 schooners such as the F. P. U. so that the catch of seals would be 500,000 instead of 126,000.

The catch or seals taken on the shore by landsmen from Cape Freels to Bay Bulls will be about 10,000—700 of which were taken off St. John's.

April 4th Captain Stevenson of the S. S. Kyle reports passing through patches of seals on a recent trip to Louisburg, the crew killed 150 and took them on board in less than an hour. Captains of the various steamers report seals numerous this Spring, but scattered."

The aerial survey, of which great hopes were entertained did not prove any more successful than that of the previous year, and it is doubtful if the undertaking will be engaged in when the voyage opens again next March. The illustrations to this article are taken from photographs made at the icefields during last season's operations, and give a good idea of the manner in which the ships move amidst the ice and how seals are killed and panned.

Shipping Movements

The new Red Cross Line steamship, "Silvia," which will ply on the New York-Halifax-St. John's route arrived from Glasgow in the early part of the month, and immediately took up her service. The ship is fully equipped in every particular both as a freight and passenger carrier and those who took the trip across the Atantic by her are free in their praises of her qualities as a sea boat. She has accommodation for one hundred and eighty first class and fifty second class passengers, and her staterooms and cabins de luxe are far ahead of those of any vessel heretofore on this service, being large, comfortable and fitted with every device for the convenience of occupants. The dining saloon is forward of the staterooms, the furniture being of mahogany, upholstered in blue plush, with dining accommodation for eighty. An elaborate and roomy music room is above the main saloon. The smoking room is well aft, being nicely upholstered in red morocco with light oak finishings. It is easily accessible from both staterooms and saloon. The officers quarters are in keeping with the general ensemble of the ship, and the crew are equally well looked after in the matter of accommodation. The Silvia, which is a two-funnelled boat, was formerly the Russian, "Orel" and is 3,460 tons gross, 1922 tons net. Oil fuel is used to generate steam for the engines. Without doubt the new boat will become highly popular and well patronized.

Badly battered from contact with a "growler" as a half submerged iceberg is known in local parlance, S. S. Norburn has been in port for some weeks, repairs now being practically completed, and ship will shortly be ready to continue on her interrupted voyage. This vessel was bound from a port in Quebec to Liverpool with deal, via Strait of Belle Isle, when she crashed into the floating menace, head-on, smashing in her bows and doing other damage to hull below the water line. The weather was foggy at the time, and the ship going at half speed, otherwise there would possibly have been another marine mystery. After the collision the ship began to make water rather more rapidly than could be coped with, and so, prudence being characteristic of all careful masters, the ship was nursed along to the nearest port, St. John's, her lumber cargo being of great assistance in keeping her afloat. On arrival, part of the cargo was unloaded and the ship put on dock. The necessary repairs were effected, and at time of writing, ship will be cleared for sea. The Norburn is owned by Messrs. Coombs, Marshall & Co., Ltd., of West Hartlepool, and is of 2,028 tons gross, 1226 net.

The French barquentine "Vinne" was towed into the port of St. John's a few days ago, badly damaged, having suffered severely in a hurricane which sprung the foremast, battered the bulwarks, started some butts and put the compass out of order. This ship was bound from Oporto to St. Pierre with a salt cargo. Extensive repairs were necessary ere the ship could resume her voyage to destination.

A LARGE FRICTION WINCH

There was recently built in Great Britain, and for one of the British Dominions, a steam winch of unusual power. This winch has three drums and is designed to hoist a total load of six tons at a speed of 200 ft. per minute. It has three barrels mounted loosely on shafts and engaging with them through friction clutches. The load may be hoisted on any one of the barrels or distributed among the three barrels. Further, while one or two of the barrels are in use for hoisting purposes, the other may hold suspended a load up to six tons. The winch is driven by a two-cylinder engine and it will be used on a large harbor.

AN ALL-ELECTRIC BRITISH LAMP

In very few of even the most magnificent large ships afloat today is use of electricity carried to such a high degree as in the British-built "Pittsburgh" which recently made her maiden voyage from Great Britain to America. This vessel, which has accommodation for 600 first class and 1700 third class passengers, is equipped with a complete electric generation station capable of developing over one thousand horse power. The extent to which electricity is employed on board this vessel may be gauged from the fact that no fewer than eighty miles of distributing cable are used. Electricity works the steering gear, lowers the boats, operates the cargo winches, drives the lifts and hoists, starts the engines, controls the sounding machines and works the printing presses. All the cooking on board is done electrically, the kitchen equipment including three large ranges, three circular roasters, a baker's oven, electrically-driven dough mixers and many small labour saving appliances such as potato peelers, vegetable choppers, meat mincers, coffee grinders and so on. All the ventilating and heating arrangements are electrically operated, and the clocks are driven by electricity and synchronized and controlled from the bridge.

THE HELIOCOPTER PUZZLE

Some time ago the British Air Ministry offered a valuable prize for the successful invention of aircraft capacity of rising vertically from the ground and of hovering over any point. Rumors are afoot that this difficult problem has been solved by the same British engineer who invented the gyroscopic monorail, in which a vehicle running on a single wheel track maintained itself upright by means of a gyroscope. Particulars of the new development are not yet available, but there is every hope that it will provide a satisfactory solution. It may be recalled that several years ago another British inventor suggested a design by which an airship heavier than air could be made to raise itself by means of electrical power. The lifting action proposed was provided by a series of wings, each operated in a particular way by means of a small electric motor, all the motors receiving their power from a central electric generator. The action of each wing was similar to the peculiar movement of a bird's wing; and the inventor claimed that a craft built on these lines would be able to rise almost directly from the ground and maintain itself steadily at any reasonable height.

C. G. M. M. APPOINTMENTS

F. C Brown to be chief engineer of S. S. **"Canadian Navigator"**; **C. Christian** to be chief engineer of S. S. **"Canadian Coaster"**; **J. J. Francis** to be chief engineer of S S. **"Canadian Forester"**; **A. Cunningham** to be chief engineer of S. S. **"Canadian Logger."**

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The Fuel Shortage

LAKE traffic this year will probably show a large decrease at the end of the season over other years. For this the strike of the coal miners is largely to blame, as the main upward freight of the lakes is coal. The shortage of coal also affects the steel mills and blast furnaces, and the result is that there are less shipments of ore down the lakes. This is an aspect of the coal strike which is very apparent to anybody travelling on the Great Lakes at this time. The ships are not only further apart than is usual, but there are a very great number of them travelling light up and down.

The situation in the coal fields does not seem to be any better to-day than it was a month ago. There is the same amount of talk about something being done to force the owners and men to operate the mines, but talk is about as far as it seems to get. The adequate protection promised those who wished to exercise their right to work if they felt like it, against those who do not wish to work nor allow anybody else to work has not materialized. This at least is the view we get when we read of the attacks of armed men on non-union miners.

Apart altogether from the rights and wrongs of the striking miners, there should be enough exercise of authority to keep the law of the land inviolate. Probably a lot of the criminal weakness which results in these spasms of terrorism and murder is due to the divided authority of State and Federal Governments, which makes it difficult for the Federal Government to intervene until the State authority has shown itself incapable of acting. On the other hand it may be the influence of those who expect to get votes later on that stays the hand of the law when murder stalks abroad. Whatever it is it is a lamentable sight for those looking on.

There is likely to be considerable suffering next winter even as it is. If the strike continues much longer, and a long cold winter should visit us, we hate to think of the outlook for the poor in this snowbound land.

Quebec and Montreal

THE ports of Montreal and Quebec keep up a continual bickering and quarreling through the mediums of their local press, each side endeavoring to show that the other is a villain. Quebec calls Montreal avaricious, and accuses her of trying to strangle the former port, while Montreal grumbles that Quebec has been allowed to lift charges in order to secure business, which makes her unable to pay interest on the funds advanced by the Dominion Government.

Our own correspondents, writing from Quebec, while evidently sharing the feeling that nothing good can emanate from Montreal, yet makes the candid admission that Montreal has in its Board of Trade a body of men who are far more interested in their city and port as a body, than the same institution is in Quebec. He also states that public opinion in Quebec is in favor of the deep waterway scheme, and that the action of the Quebec Board of Trade, in endorsing a resolution condemning that scheme, was not representative of the people in general. It is felt in Quebec, or so our correspondent claims, that the deep waterways would benefit Quebec by making it the terminus of all deep draught vessels. We do not think that this mutual recrimination between the two ports will result in any benefit to either. The supremacy of Montreal as a port is entirely due to her geographical position, and if it were possible to maintain navigation all the year round, we do not doubt that Montreal would eventually become the largest port on this continent.

We do not agree with the view that the deep waterway scheme would in any way benefit Quebec, supposing that the scheme ever reaches completion in the manner proposed at present. We do not agree with our correspondent when he states that deep water vessels would make Quebec their terminus any more than they do now. Shipowners who are building vessels for the Quebec trade will build them to suit the necessities of the St. Lawrence navigation, which will enable them to reach Montreal as they do at present.

It is not to the benefit of any one in particular to proclaim to the world at large that the channel between Quebec and Montreal is a dangerous and difficult one to navigate, and that ships are liable to go ashore there on every trip they make. The evidence does not bear out such a statement.

We sympathize with the people of Quebec who wish to have trade in their port, but we still think that the port which offers the best inducements gets the trade. It seems to us that there is every possibility for the port of Quebec to build up a very good intercoastal trade, with the large farming and industrial community which is behind it. There is a continual growth of population down the lower St. Lawrence, and this could be helped and a good trade built up by the judicious establishment of coastal services.

Press Comment on Marine Matters

MONTREAL'S AVARICE

The Montreal Gazette is evincing a sudden but decided interest in the management of the harbor of Quebec, a leading article being devoted in a recent issue to this important topic. There is, however, reason to suspect that although the voice is the voice of the Gazette, the hand is the hand of Mr. M. P. Fennell, general manager of Montreal harbor, who is so averse to seeing business moving through other ports as to cry before he is hurt.

It will be remembered that the local Commissioners recently announced their decision to waive tonnage dues of seven cents net register ton, also side moorage of sixty cents per hundred tons net register, on steamers loading full grain cargoes. This causes the Montreal paper to inquire "Upon what ground in reason and fairness is Montreal discriminated against? This port," it contends, "has captured in competition not only with Quebec but with New York, Boston and other United States ports, the largest share of the export grain trade of the continent, and has held its place as the principal import harbor of the Dominion. We do not imagine that this supremacy is endangered by the reduction in charges the Quebec Harbor Commission has made, but we do submit that it is grossly unfair to require the Montreal Commission to tax the traffic of this port to a point productive of revenue sufficient to pay full interest on Federal loans, while Quebec and other ports are permitted to evade this obligation and at the same time receive constant new advances from the Federal purse upon which no interest has ever been or ever will be paid."

The trouble is that the whipsaw game is invariably played upon Quebec. Some time ago we were told by Col. Gear that one of the reasons our harbor got little business was the inadequacy of its facilities. Later, when an attempt was made to secure money to add to these facilities, we were told that the money would be wasted because no business was being done at the port. Now, when we try to attract business to justify the expenditure, the thunders of the Gazette are let loose against us. Incidentally, too, it is rather amusing that Montreal should raise the cry of discrimination, even although they admit that their supremacy will not be endangered, after sneering contemptuously at Quebec for so many years as "poor sports," because after being stripped of almost everything but the water that flows past our shore, we have similarly complained of discrimination.

What grievance has Montreal? The reduction of charges is made only on one particular class of traffic, of which Quebec has been receiving nothing. There is grain business and to spare for both and the government will lose nothing because the local harbor will derive revenue from the operation of the elevator to help in paying interest upon the money invested here. It has yet to be seen, moreover, whether even the concessions made will be sufficient to offset the powerful influences at Montreal's command.

The Gazette even goes so far as to boast of its harbor's strong financial position, in the following terms:

"Now, it may be argued that the port of Quebec is entitled to receive gifts of public money as in the case of a hundred and one harbors throughout Canada made and maintained at public expense; but why discriminate? Why should the port of Montreal be required to pay interest on government loans when all other ports go free? Debentures of the port of Montreal to the amount of $30,855,000 are outstanding, all of which with the small exception of $330,000 are held by the Dominion Government. In 1921 the Montreal Harbor Commission paid interest of $1,040,693 on these debentures and set apart $289,670 as a sinking fund to retire the same. The revenue of the port, which last year exceeded expenditure by $167,000, is derived from its grain elevators, wharfage rates, rentals and railway service, all of which constitutes a charge upon the trade, and if the Dominion Government meted out the same treatment to Montreal as to Quebec in respect of loans of public money, the imposts on the traffic of this port could be reduced upwards of a million dollars yearly."

Our Montreal contemporary of course knows his own business best, but, in our opinion, he would do well to refrain from such indecent displays of opulence. The people of Canada may yet discover how many millions of their money have been, are being and will continue to be sunk in dredging and keeping dredged an artificial channel in the river between Quebec and Montreal, which is in every sense of the word a local improvement for the benefit of the latter port, since the business could be handled with equal economy and efficiency right here. If these millions are figured up and charged against Montreal Harbor Commission where they belong, it may be found that it has not paid such a generous return to the government after all. If ever there was discrimination against one port in favor of another, it was when the government dredged out this channel in order that Montreal could take away the St. Lawrence traffic from Quebec.

Let us hope that Mr. Fennell and his organ will get over their hysterics in due course and that they will have the generosity to see a few bushels of wheat that they could not possibly handle themselves for congestion, allotted to the Ancient Capital without being overcome by the gnawing pangs of avarice.

—*Quebec Chronicle*

AN AUTOMATIC LIGHTHOUSE

Another boon to mankind is the automatic lighthouse device erected by the British Board of Trade. That it is likely to become a universal necessity in the very near future is almost certain. Surely the perils of the sea have worried mankind since time immemorial! School boys read of the sinking of ships while hardly a week goes by without its story of disaster on sea or lake.

Travelers note with gratitude the appearance of the lighthouse with its flare of warning that danger's near. Thoughts of kindness instinctively rise for their lonely keepers. But storms may prevent proper care of lonesome lighthouses. Accidents may befall their keepers. So the new invention gives protection that is needed. It lights itself when darkness comes and puts out the light when daylight returns. The only care it needs is an occasional "feed" of chemicals and a replenishing, every two years, of its gas tanks.

This invention, already successfully tried at several dangerous points on the English coast, will be particularly valuable on the rock bound shores of Lake Superior as well as on Canada's salt water boundaries.

—*Windsor Star*

THE MERCHANT MARINE

Government ownership of railways is frequently compared with government ownership of the merchant marine. "If the merchant marine is not to be given a chance, why not abandon the Canadian National railways?" asked one member at Ottawa in the course of a debate on the deficits piled up by the government vessels.

There is a very great difference between the two. In fact, they are hardly comparable at all, except in the fact that both are common carriers.

Immense capital is necessary to enter the business of railroading. Anyone who can scrape together the cash necessary to purchase a tramp steamer can enter the business of water transportation. The sea highways of all the world are open to him. He must comply with certain regulations and must be an experienced navigator, but apart from that the world is his oyster. There are no right-of-ways to buy, no charters to secure from Parliament, no rails to lay.

Theoretically there is no reason why government-owned ships should not or could not compete with privately-owned vessels. But they would have to be built as cheaply as privately-owned ships are, and would have to operate on the same level of efficiency in every respect. Even then they could compete only in a steady carrying trade. To roam the world, picking up a cargo here and a cargo there, trading and bargaining in a hundred ports, is a sphere beyond the reach of a government-owned vessel.

The government's policy is to take 27 of the smaller vessels out of commission immediately, and sell them off as opportunity offers. The remaining ships, which are of real service in a steady carrying trade in co-operation with the Canadian National railways, will be kept in commission. For the service for the past eighteen months and the coming nine months a total deficit of $4,300,000 is anticipated, but that sum apparently includes some capital expenditures in connection with the ships.

The ships were built in a war emergency, and even though they came too late to be of much service, the Dominion may be philosophical about it and write off the cost of them as a war expenditure. A mistake was made when the shipbuilding policy was carried beyond the termination of the war, and a further mistake when the attempt was made to keep them all in commission, even though freights were lacking. Both mistakes Hon. W. C. Kennedy is now endeavoring to correct, so far as lies within his power.

—Saskatoon Star

NO MAN'S WATER

Whenever we survey the Great Lakes we think of them as inland oceans which are splendid natural adjuncts to Canada. Doubtless our neighbors to the south look north, and feel the same way about it. The vessels of both countries ply back and forth on them, but the double jurisdiction prevents an unimpeded competitive service irrespective of the country of registry. For instance, there is an arrangement between Canada and the United States by which a Canadian vessel may carry a cargo from a Canadian port to an American port, and similarly an American vessel may carry a cargo from an American port to a Canadian port, but a Canadian vessel may not carry a cargo from an American port to an American port, neither can an American vessel carry a cargo from one Canadian port to another.

That may seem a wise arrangement in order to keep as far as possible receipts for freight originating in one country in the pockets of vessel owners of that country, and also to ensure in prosperous times a certain supply of vessels. But just now out of this arrangement there is developing a situation which promises to divert to United States railroad companies the carrying trade for a larger part of Canadian wheat than should go to them. American vessels under the above arrangement can compete with Canadian vessels in bringing wheat from the head of the lakes, but they are obliged to take it to an American port. As there is little traffic down the lakes this season in iron ore, the American vessels are competing for grain cargoes and will carry grain to Buffalo at two cents a bushel. Canadian vessels to get some of the grain business going to Buffalo meet this rate but they still charge three cents a bushel to Port Colborne and two and a half cents a bushel to Georgian Bay ports. Grain shippers want the government to permit American vessels temporarily to run between Fort William and Canadian ports with grain cargoes so as to equalize the competitive conditions and give the same advantageous rates to Canadian ports as to American ports.

The ability of the Canadian vessels to compete successfully with American vessels for grain cargoes to American ports is cited by the shippers as evidence that they could compete just as well to Canadian ports. Their protest will no doubt be given due weight at Ottawa.

—Toronto Saturday Night

What British Shipping is Doing

The position with regard to shipping was fully covered by Sir Owen Phillips, G. C. M., M. P., chairman of The Royal Mail Steam Packet Co. at the annual meeting held on 1st June last.

After dealing with the accounts and various services, Sir Owen stated that, in British shipping, one of the outstanding after-results of the war has been the growth of foreign competition. The war gave a big stimulus to the mercantile marines of a number of countries, and owing to the temporary shortage of shipping immediately following the war, the newcomers for the time being prospered exceedingly. Then came the slump, and there was not enough business to go round, which has resulted in severe competition in almost every trade.

While British shipping has to fight unaided for its existence, foreign ships are, in many cases, supported and assisted in various ways by their respective governments. British shipowners firmly believe that, in the long run, they will more than hold their own, but where competition is state-aided, it must necessarily be an uphill figure, and British shipowners may need to look to their Government for a greater measure of sympathy and consideration towards the shipping industry than has hitherto been extended to them.

It must not be forgotten that British shipping played a vital part in the war, and, in my view, the British nation cannot, under any circumstances, afford to let its mercantile marine take a secondary place. Another outstanding factor in shipping since the war has been the growing tendency amongst certain nations to discriminate in various ways against the ships of nationalities other than their own, such as debarring them

from participation in coastwise trade, imposing much heavier dues and customs charges in the case of foreign ships against their own, and otherwise.

Great Britain has stood for centuries for the freedom of the seas, and extends vessels of all nations the same treatment in all respects, as to her own. It is to the interests of all that the seven seas should be free and I hope that all discriminating measures may be dropped.

In dealing with the general outlook Sir Owen said:

There was never a time in my experience when it was more difficult than at present to forecast the future. One thing only is certain, and that is that no trade in the world moves in more regular cycles than the shipping industry. It is now just over two years since the post-war shipping boom collapsed. The prices of commodities and also of ships, although they may not have reached bottom, are now tending to stabilize, and in some cases, even slightly to advance.

Swan, Hunter & Wigham Richardson, have recently built to the order of a French company the S. S. "Alsina" intended for traffic in passengers and frozen meat between Italy, France, Spain and South America. The refrigerating plant has been supplied by J. & E. Hall. The main propelling units comprise two sets of double reduction geared turbines of the Rateau type and Robinson superheaters and boilers arranged to burn either coal or oil. The same company has also built the S. S. "Rallus" for service between the Mersey and the Netherlands.

Ellerman's Wilson Line have ordered from the same shipbuilders the S. S. "Cito" as a small coasting steamer and this has recently been completed and has proceeded for its maiden voyage. A motor tank ship ordered from the same firm by a tobacco company has also been completed.

Harland & Wolff have recently supplied the S. S. "Sophocles" for the Australian trade. Her tonnage is 12,300 gross and the length is 500 feet. The propelling machinery consists of Brown-Curtis compound turbines transmitting their power to the propellers through the double reduction gearing. These are supplied with steam from oil fired boilers.

The S. S. "Bellview" has recently been built by John Readhead & Sons, for the Bellview Shipping Co., Ltd. The vessel is 400 feet long and is designed for general cargo trade, but arrangements have been made specially for grain cargoes. The masts are telescopic for the purpose of passing through the Manchester Ship Canal.

Craig, Taylor & Co., have recently handed over to her owner a new cargo steamer, the S. S. "Helena." This ship has been built to the highest class at Lloyds and to the requirements of the Dutch Government. The ship also has been designed with a view to passing through the Manchester Ship Canal.

Workman, Clark & Co., have recently launched the cargo steamer "Port Campbell" from their works at Belfast.

William Gray & Co., have recently delivered "The City of Yokohama" to the Ellerman Lines, Ltd., for the Far Eastern service. She is 484 feet 6 inches in length and is arranged with cargo handling appliances for that trade. The propelling machinery consists of double reduction geared turbines of the Parsons type and boilers are supplied with an oil burning installation.

Work on motor ships provides the bright spot in the shipbuilding industry in the present depressed state of affairs. This is evidenced by the departure of three 14,000 ton motor ships on their maiden voyages, the trials of two 11,000 ton ships, and the completion of a vessel of 9,600 tons from the Scottish yards within the last few months.

Launch building on the Thames is at present in an interesting condition. J. I. Thornycroft & Co. are developing 38 foot shallow draught launches for overseas service. This firm have also standardised 35 foot cabin cruisers which can be met with in the most unlikely places all over the world. This type has proved extremely reliable and embodies also comfort and speed. At the Hampton Launch Works of this firm a motor house boat has recently been built Houseboats of the kind which are not propelled are, or course, a well-established institution, but in view of the desirability of moving about the motor driven houseboat should prove attractive for long holiday purposes where accommodation is more important than the speed.

Opinions continue to be expressed by prominent persons connected with the shipping and shipbuilding industries in favour of the fitting of oil engines to ships which are being built or are projected for future building. It would appear that there is some sort of economical relationship between the price of coal and the price of oil, both going up or down together. The difference is, however, always in favor of the use of oil for cargo and passenger carrying vessels, even though oil bunkering from the United Kingdom is not so economical as bunkering in American ports.

The latest to comment on this subject is Mr. Carlsson, the head of the Trans-Atlantic Steamship Company. This company possesses one of the largest fleets of steamers in Sweden and operates a number of motor vessels of various sizes, as well as steamers. As a result of several years' experience with oil engined craft, Mr. Carlsson considers that the motor ship is overwhelmingly superior and adds that his company will build no more steamers for the present. To this must be added a statement by Sir George Hunter last month that his firm had laid plans for a very big development in shipbuilding, and also another by a leading engineering concern in the United Kingdom who stated that they will lay out works specially for the manufacture of modern Diesel engines. It would appear that we are about to witness a complete change from marine engineering of the past and that the more enterprising firms who are prepared to develop the oil engine will undoubtedly reap the reward of their foresight.

From evidence of the order books of United Kingdom firms, it would appear that this movement is of great importance. It has turned the bottom of the depression in shipbuilding and things appear to be likely to follow the upward trend; but for the development of the oil engine it is doubtful whether the end of the depression would have been in sight.

On Tuesday, the 4th inst. the large oil tank steamer "British Grenadier," which has just been constructed by Swan, Hunter & Wigham Richardson, Ltd., at the Neptune Works, Newcastle-on-Tyne, for the British Tanker Co., Ltd., of London, completed a very successful trial trip off the mouth of the Tyne.

The steamer has been designed to carry over 10,000 tons of oil, and is about 455 ft. long by 57 ft. beam. She has been built to attain the highest class in Lloyd's Register, and has been fitted with the most modern appliances for her intended service, including wireless telegraphy, very complete electrical installation, Hele-Shaw steering gear, refrigerating machine for provisions, etc., etc.

The propelling machinery has also been constructed at the Neptune Engine Works of Swan, Hunter & Wigham Richardson, Ltd., and consists of a set of turbines of the Metropolitan-Vickers Rateau tpye with double reduction gearing of the 3 box, floating frame type, supplied with steam by three large boilers fitted with Howden's system of forced draught, and burning oil fuel on the Wallsend-Howden system. The principal engine room auxiliaries are electrically driven.

The machinery worked on the trial trip without the slightest hitch, giving satisfaction to all concerned, and driving the fully laden vessel at a speed of 11¾ knots.

The owners were represented by Mr. J. J. McKenzie, asst. superintendent engineer and the builders by their managing director, Mr. G. F. Tweedy.

BOOKLETS

The Canadian Ingersoll-Rand Co. has just issued a revised treatise, in the form of a booklet, on the Lubrication of Air Compressors. The matter is a reprint of an article prepared by H. V. Conrad, M.E., former secretary of the Compressed Air Society of New York.

MARINE NEWS FROM EVERY SOURCE

Cleveland:—Coal for the lake steamers is getting very short, and it was predicted that there would be little available after the 20th of this month. Due to the continued strike reserves have all been used up.

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Sarnia:—The tug T. R. Thompson sank recently at her moorings, and submerged entirely with the exception of the top of her pilot house. She is in a position which will make it a comparatively simple matter to pump her out and refloat her.

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Sault Ste Marie:—The steamer "W. C. Franz" bound down light, rammed the steamer "Shenango" also bound down, off the Valley Camp coal docks. The weather was thick, and the "Shenango" was rounding to the dock when the "Franz" came along and rammed her. The "Shenango" had to be beached.

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Kingston:—The steamer "Huronton" down bound with grain, went ashore at St. Denis, eight miles from Coteau, near Montreal. The tug "Mary P. Hall" and a lighter from the Donelly Salvage and Wrecking Company were dispatched at once to the scene, in order to refloat her.

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Quebec:—The steamer "Airedale" after being in collision with the Donaldson liner "Orthia" proceeded to Quebec under her own steam. The "Airedale" had a badly shattered bow, the plates being damaged from the water line to the hawse pipe, but apparently not below the water line. The "Orthia" was beached after the collision, with a large hole on her port side.

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Brockville:—On a recent trip to Alexandria Bay, the steamer Brockville on her return trip to Kingston, went over a sunken dock and remained fast. Her passengers were taken by motor boats back to Alexandria Bay, and after being thus lightened she floated, and was able to pick up her passengers again, and complete her voyage to Kingston. There was no excitement or fear among the passengers, and no damage was done to the vessel. The buoy that in former years has marked the end of the dock, has not been placed this year, hence the accident.

Hamilton:—The Harbor Commission and Board of Control of Hamilton at a recent meeting passed plans for the development of the harbor. Included in this is a canal at Stipe's Inlet, the land belonging to the city, which will receive in exchange land east of the inlet which will be reclaimed. Plans will be submitted to the government shortly in order that their consent may be obtained.

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Ottawa:—In connection with the transference of the various departments of the Naval Service to the Department of Marine and Fisheries, five branches have already been transferred. They are the fisheries protection, radio telegraphs, hydrographic survey, tidal survey, and northern waters patrol. The fisheries protective branch includes six protective vessels, two on each coast and one on the Great Lakes.

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Toronto:—A dry dock for the accommodation of the Toronto city tug G. R. Geary, in order that she can comply with the regulations requiring that she be drydocked every three years in order to retain her coasting license, has been constructed by Mr. Margerison, superintendent of the marine department of the Department of Works. The dock is 50 feet long, 18 feet across, and was constructed at a cost of less than $1,000.

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Ottawa:—Representations have been made by the shippers of grain from Toronto and Winnipeg that they are being discriminated against by vessel owners giving a better rate to Buffalo than they do to Canadian ports. The department is urged to suspend the regulation prohibiting American vessels carrying cargoes from one Canadian port to another in order to introduce competition and bring the rates down to the levels now charged by American ships.

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London: — Advices from Australia show that the Australian Government is having considerable trouble with the Seamen's and Firemen's Union in operating the Commonwealth line of steamers. They had a crew already engaged and a vessel ready to sail when the union objected to the presence of a bo's'n, and refused to allow the vessel to go to sea. The government has threatened to lay up all their vessels if they are not allowed a free hand in running them.

Ottawa:—The ice breaker "John D. Hazen" the ice breaker originally built for the Canadian Government, and recently bought back from the French Government for service in Canada, has now been fully repaired, and is on her way or will shortly be on her way back to Canada. The government saved over $1,000,000 by buying back this vessel instead of building a new one. The "John D. Hazen" has never been used for the purpose for which she was built.

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Vancouver:—Tenders are now in for the new pier for the Canadian Pacific Steamships, which will represent an expenditure of approximately $2,000,000 in addition to what has already been spent in filling in the site. The pier will be a double deck wooden construction, with a substructure of either cement, creosoted wood piling, or Australian hardwood piling. Tenders for all three methods are being requested. This pier will be 850 feet long, by 330 feet wide, with four railway tracks in the centre.

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Ottawa:—The list of vessels of the Canadian Government and Mercantile Marine which have been recommended for sale are as follows: Canadian Warrior, Recruit, Trader, Sailor, Signaller, Adventurer, Gunner, Aviator, Sower, Settler, Raider, Farmer, Miner, Beaver, Sealer, Observer, Trapper, Hunter, Rancher, Rover, Coaster, Harvester, Pathfinder, Engineer, and Logger, and the three vessels, the Thos. J. Drummond, Sheba and J. A. McKee, which were transferred from the Department of Marine and Canals to the C.G.M.M. fleet on April 1, 1920.

Of the remainder of the fleet of 66 ships, the Canadian Exporter came to grief in the Pacific Ocan, and the Commander went ashore near Platte Point, on Little Miquelon Island, on July 3: If the latter vessel is again placed in commission the C.G.M.M. fleet will total 37 vessels. The Canadian Recruit, which was included in the list of vessels recommended for disposal, was rammed by the steamer Maskinonge while lying at anchor in the St. Lawrence and was abandoned to the underwriters. The loss on her was stated to be covered by insurance.

Sydney, N. S.—The new revenue cutter "Sagamore" will be in commission by August 1st. She is being equipped with guns fore and aft. Captain Nicholson, of Arichat, will be in command, with Captain John Cruikshanks of Whitney pier as first officer. The "Sagamore" will reinforce the cruiser "Margaret" and the cutter "Greb," which craft are now kept busy intercepting a small horde of craft smuggling liquor between the French Islands of St. Pierre and Miquelon, and the Cape Breton Coast.

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Sydney, N. S.—Twelve steamers are now engaged in the export of iron ore from Wabana, Nfld. to Germany via Rotterdam. It is stated at the Sydney headquarters to the British Steel Corporation that about three quarters of a million tons will have been exported befor the end of the calender year. It is further stated that payment for the ore is being made in English funds.

Government Merchant Marine Steamer Canadian Commander was refloated on July 15th and was taken to the St. Pierre Roads where temporary repairs will be made after which she will proceed to Quebec and there she will be surveyed and arrangements made for permanent repairs. The latest report is that the "Commander" is not nearly so badly damaged as was at first supposed.

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St. John, N. B.—Under date of July 5th it is announced that the court of inquiry convened under Captain L. A. Demers, Dominion Wreck Commissioner, find that the bridge tender of the Morrisey Bridge at Chatham, N. B., or his employer the New Brunswick Provincial Government, is responsible for the C. G. M. M. Steamer "Canadian Squatter" colliding with the structure. It was found that the pilot followed a dangerous practice in going too near the bridge, but the majority finding of the court, of which Captains McLean and Mitchell are members, relieves the pilot and shipmaster from any blame. Their certificates were returned to them. Captain Demers recommends more clear definition of the caretaker's instructions and that regulations governing pilotage be framed by the Harbormaster.

The Board of Management also recommended that the capital cost of the vessels be reduced to what might be considered present replacement values.

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Quebec:—The Canadian Government exploration ship Arctic will leave the King's Wharf about 6 o'clock to-morrow morning for northern waters, according to a statement made by government officials to-day. She will sail under the command of Captain Joseph Elzear Bernier, who is making his 27th trip to the far north. It is rumored that Mr. J. D. Craig, C. E., of the Department of the Interior, is to be in charge of the party. Mr. Craig, however, will give no information about the Arctic's voyage, save to say that she will uphold Canada's interests in the north. Captain Bernier will be in charge of the ship only. Inspector Willcocks, of the Royal Canadian Mounted Police, Ottawa, is in charge of the party of police who will be taken north by the Arctic, and who have enough provisions to last them two years. Besides Inspector Willcocks, the party is composed of Corporal Jakeman, Corporal McInnes, Constables Fairman, Fielder, Lee, Anstead, Must, Friel, and McGregor. Inspector Willcocks declared they would go as far north as Ellesmere Land, and would collect Customs duties and do patrol and exploration work.

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Ottawa.—Complaints have reached the Hon. J. A. Robb, minister of Trade and Commerce, that higher rates are being charged for the movement of grain in Canadian Lake carriers from Fort William to Port Colborne, than for transportation in United States vessels from Fort William to Buffalo. This is explained by the fact that certain vessels registered in the United States, which were formerly engaged in other classes of trade, are now readily available for the shipment of grain. Coasting laws prevent United States carriers from discharging their cargoes at Port Colborne. Thus Canadian grain is being diverted to the United States routes at Buffalo. There is, at present, no authority which can contest steamship rates and the coasting regulations do not permit of competition having its full effect, regarding trade between Canadian ports.

Another complaint has reached Mr. Robb from purchasers of grain exported to Great Britain by way of New York. The allegation made to the minister is that wheat reaching England does not grade as high as when it left the Canadian terminal elevators at Fort William and Port Arthur. The inference thus is that it has been subject to mixing between the shipping point and its destination.

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Montreal.—On July 9th the ocean freighter Bayeskimo docked at Montreal. The steamer is a new addition to the fleet of the Hudsons Bay Company. July 15th for Labrador, Ungava Bay, Hudson Strait and thence to Baffin Bay, calling at Pond's Inlet, a newly established post of the Hudson's Bay Company. The Bayeskimo was built at Ardrossan, Scotland, and after being purchased on the stocks was reinforced to withstand the ice pressure met with in The steamer sailed from Montreal on the northern seas. She will bring back a report from Pond's Inlet of the herd of reindeers which was placed there last year by one of the company's steamers. This herd was loaded in Norway and experiments of how Norwegian reindeer will fare in Canadian territory is creating a great deal of interest and if the reindeer have wintered well it is considered likely that the Hudson's Bay Company will again run a cargo of Norwegian reindeer into the barrens of northern Canada this summer. The Norwegian tpye of deer are larger and more easily domesticated than the Canadian species and are considered valuable for food and transportation purposes.

"CHICAGO TRIBUNE"

A very successful trial trip was run to-day by the "Chicago Tribune," a cargo steamer specially designed for service on the Canadian Lakes and built by Messrs. Swan, Hunter, & Wigham Richardson, Limited, at their Wallsend shipyard to the order of the Ontario Paper Co., Ltd., one of a group of companies in which Col. Robert R. McCormick, the well-known United States newspaper proprietor is largely interested.

The speed attained was 8¾ knots ,the indicated horsepower being 856.

The "Chicago Tribune" with her sister ship the "New York News," will be engaged in the transport of wood pulp from the St. Lawrence River to the paper mills at Thorold, Lake Ontario. She is 2,300 tons deadweight on a very shallow draft, the principal dimensions being 250 ft. between perpendiculars, 43 ft. in width with a moulded depth of 19 ft. 4 in. The vessel has been built to the highest class of the British Corporation Registry.

The engines driving a single propeller are of the triple-expansion surface-condensing type, placed at the after end of the ship. Steam is supplied from two single-ended multitubular boilers working at a pressure of 180 lbs. per square inch. The machinery and boilers have beeen built by the North Eastern Marine Engineering Co., Ltd., of Wallsend-on-Tyne.

Messrs, Swan, Hunter, & Wigham Richardson, Ltd., have embodied in these two ships their long experience and special knowledge of the design and construction of vessels for the Great Lakes and canal service.

The "Chicago Tribune" after her successful trial is proceeding direct to Canada.

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PALM OIL AS A FUEL

Palm oil is reported to have given successful results as fuel for a stationary two-cycle semi-Diesel engine of Swedish make, the tests having been made in Belgium. The engine's storage tank for the oil was divided into three compartments, and so fitted that the hot exhaust gases and the cooling water from the cylinder melted the contents of the tank. The wire screening dividing the tank served to filter the melted oil. The engine was started with crude petroleum, and as it warmed up the change to palm oil was made through the automatic feed.

Diesel Engines Ashore and Afloat

By H. F. P. PURDAY

THE following very interesting paper on the Diesel engine was read recently before an audience composed of the members of the Diesel Engine Users' Association, and due to the fact that very many of them were interested in land installations, the author treated the subject with that idea in view.

Speaking on this topic, he pointed out that the Diesel engine for land purposes is mostly limited to sizes up to about 1,000 h.p., the marine type for which there is the greatest demand ranges from 1,000 h.p. upward. Discussing the conditions which are characteristic of the latter, he remarked that the first and most obvious consideration is that the foundation—i.e., the hull of the ship—is subject to more or less violent motion, and is not rigid. This fact controls a number of minor but none the less important details, but in particular considerable rigidity must be secured, either in the engine framing or in the seating in order to avert troubles due to the main bearings getting out of alignment. Also, the liability to a certain amount of racing in rough weather must throw heavy loads on the crankshaft, and thus the classification societies have devised rules which very wisely provide for crankshafts considerably stronger than those usual in land practice. The necessity for ability to start up from any crank position limits the number of cylinders to a minimum of six for four-stroke and four for two-stroke engines, with the usual arrangements for admitting air to the main cylinders. In the early days of marine Diesel engines the problem of reversing was considered one of the great difficulties; at the present day any number of efficient means of reversal are in successful use, and new ones could easily be devised if there were any object in doing so. Nevertheless, the ability to execute manoeuvres promptly is an important one, and it goes without saying also that a marine engine should possess a very high degree of reliability, while accessibility of working parts is studied to a greater extent than on land engines. In one or two respects the marine engine is more favourably circumstanced than a land engine. Cooling water is available in unlimited amounts, and provided the temperature is not allowed to rise above about 130 deg. Fahr. there is practically no deposit. It is, in the author's opinion, very doubtful if marine Diesel engines would have achieved their present success if they had been required to work with the hard water which many land installations have to cope with. To appreciate that fact one has only to consider the large percentage of piston seizures, cracked covers, cracked pistons, etc., which are directly and indirectly traceable to deposits of scale in the water spaces. A marine engine works for the greater part of its working life at a nearly constant load, and is not like many land Diesel engines, continually starting and stopping every few hours. All marine Diesels of any size are fitted with cross-heads and guides, which practically eliminate the bugbear of seizures. Finally, they are under the control of a sufficient staff of qualified attendants. As regards the respective merits of the four-stroke and two-stroke cycle engines. the author declared that the reliability and economy of the former was no longer open to question, having been established by something like ten years' experience of large ocean-going vessels. The two-stroke engine has been slower in development, and success has not been so immediate. Nevertheless the best makers of two-stroke engines can now give fuel consumptions practically as low as those of four-stroke engines, with less expenditure of weight, space, and first cost. Furthermore, such engines have an overhead capacity over and above the normal rating, equal to, if not in excess of, those of four-stroke engines. This has come about by improvements in scavenging and increase of the mechanical efficiency. Experience alone can decide whether they are as reliable as their four-stroke competitors. Meanwhile there is considerable controversy on the subject of heat stresses, and the opponents of the two-stroke principle are disposed to maintain that on this score alone a two-stroke engine can only be safely run at a rating which largely discounts the advantages of having an impulse every revolution. There can be no question but that the provision of relatively small two-stroke cylinders to perform the same work as relatively large four-stroke cylinders does entail some thermal problems of an important character.

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The most case-hardened adherent of the air-blast system must recognize that solid injection has made great progress of late. The very remarkable fuel consumption of some of the modern semi-Diesel engines is sufficient indication of this. So far the use of solid injection on large engines is confined to two or three makers. The three vital considerations are: Fuel consumption; absence of smoke in the exhaust; and overload capacity. So far the very best fuel consumptions seem to be associated (on the solid injection system) with high maximum pressures which are penalized by the registration societies. When the maximum pressure is limited to 500 lb. per square inch, the fuel consumption is usually slightly higher than with the air blast system. On the score of clean exhaust and overload capacity he holds that the solid injection system is at present definitely inferior to the air blast system. The overload capacity is required to cope with the inevitable diminution of load-carrying power as the liner wears, and to allow for the fact that an engine cannot always be in the best fettle. The absence of smoke has an obvious bearing on the frequency with which overhauls are necessary. The solid injection system would appear to show to the greatest advantage in the Still engine, where compressed air for starting purposes is not required. The reason for the low piston speed of two-stroke engines is not obvious on the face of it, but is probably due to (1) the desire to make use of low scavenge pressure in order to secure a good mechanical efficiency; and (2) the desirability of keeping the revolutions low on account of propeller efficiency. In any case two-stroke engines are not necessarily restricted to low piston speeds. Two-stroke engines of large size have yielded high values of M.I.P. with quite moderate fuel consumption with piston speeds of about 1,000 ft. per minute. The special troubles of large Diesel engines are mainly thermal difficulties of three classes: (1) Local overheating, as, for example, of exhaust valve heads, piston crowns and rings, liner surfaces; (2) local temperature differences giving rise to temperature stresses; and (3) extensive temperature differences, also giving rise to stresses. An example of the third class is furnished by the cylinder cover of a four-stroke engine in which one port (the exhaust port) is not, and the other (the air port) is relatively cool and racking stresses are set up in the bottom plate. Also the outer edge of the bottom plate is cooler than the centre, which is thereby put into a state of compression at the expense of tension at the edge. Cases of this sort seem to play a predominating part in the failure of cylinder covers. Such stresses are difficult to calculate owing to the complexity of the casting. The trend of modern design seems to be to eliminate these extensive temperature stresses by dividing the castings into smaller pieces having considerable freedom of expansion. Turning to the future, he expressed the view that the Diesel engine would have before long to be seriously considered for high-powered Atlantic liners, which would call for something like 16,000 s.h.p. per shaft. It has been calculated that the weights of reciprocating machinery for this power would work out at about as follows: Engines, propellers and shafting, 1,100 tons; boilers, 1,200 tons; and

pipework, 431 tons—a total of 2,730 tons. The weight of a six-cylinder 16,000 s.h.p. two-stroke Diesel engine would be, say, 2,200 tons, or practically equivalent to that of reciprocating engines and boilers. But if and when Diesel engines come up for consideration for such large powers as those alluded to, the comparison will naturally be made with reference to geared steam turbines and not reciprocating steam engines. The decision one way or the other would depend on economic considerations of first cost, running expenses, etc. In conclusion, the author claimed that the comparisons made with existing reciprocating steam plant show that the Diesel engine proportion is technically feasible.

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The behaviour of Diesel engines in adverse weather conditions has been proved to be of a much more steady character than that of steam engines, the performance of the latter, especially if fired by coal, being largely dependent on the state of the boiler and on the working of the trimmers and firemen. Such factors are, of course, entirely dispensed with in motor-ships; but there is one danger which until now has not been taken enough notice of in shipping circles. The technical construction of the Diesel engine allows without any difficulty a considerable increase of the regular performance, all that is needful for this purpose being a small increase of the stroke of the fuel pump, so that the quantity of fuel injected is augmented. By this the average pressure and the number of revolutions are raised, these two items together resulting in a considerable increase of power. Now, the normal capacity of an engine, as stated by the builders, is based on a certain quantity of oil to be burnt and a certain amount of heat to be created in the cylinder without danger of destroying the walls, covers, pistons and valves. If the average temperature be increased by burning more oil than the normal quantity, the influence of the superfluous heat may be disastrous. Indeed, this is more dangerous than augmenting a boiler's pressure beyond the margin of safety. Nevertheless such a thing is very simple with the Diesel engine. There are frequently reasons for wishing a certain increase of power, either to maintain a steady speed in bad weather; to keep the same speed with a foul bottom as with a newly coated one, or in order to catch a tide; and as a rule the engine has sufficient reserve of power for such occasions. Trials have been made in which Diesel engines have been run all-out without causing trouble. A Sulzer engine, for instance, has been driven at sea 30 per cent. above its nominal capacity; while the Doxford engine of the Yngaren was run at 10 per cent. above its normal i.h.p. for six days. These trials may be all very well for testing the reliability of the engine, but they ought to be quite exceptional. Owners and their officials should not expect the Diesel engine to do more than is asked of a steam engine, for it is, perhaps, the most serious disadvantage of the Diesel engine that it is not fool-proof in the same degree as is the reciprocating type. They should be content with a steady and regular performance under all conditions. Of course, there is the possibility of limiting the stroke of the fuel pump to a delivery for normal performance, but there are some cases in Diesel engine practice which require a temporary increase of power; for example, when valves are "hanging up."

POWERFUL SALVAGE SHIP

Described as a wonder ship for a wonder job, an interesting addition has just been made to the fleet of the Ocean Salvage Co., in the shape of the vessel Dalhousie, which has been fitted up by Messrs. Smith's Dock Co., at their South Bank yard on the Tees. The vessel was formerly the fishery protection cruiser, "Hearty," and she is regarded to-day as the most completely equipped vessel afloat.

Her gear is described by the shipyard's monthly publication as the sheer epitome of mechanical and scientific genius. Under banked fires the Dalhousie can stay two or three months on a job before returning to her base for supplies. An entirely new feature is the low intermediate and high injection valves with which she is fitted.

The reason for this is interesting. Supposing a vessel is stranded high up on a sandy shore, the salvage vessel may have to dredge a channel into her, and this is done more often than not by means of her own propellers. When the propeller is churning up the loose sand it inevitably gets into the condenser if the injection be open very near the bottom of the vessel. Consequently, when the work is going on either the intermediate or the high injection, which are respectively a greater distance from the bottom, can be used and thus open out into clear water.

A line gun is provided by which a line an inch and a half in thickness can be thrown 250 yards. The Dalhousie is fitted with engines capable of developing no less than 2,400 indicated horsepower, several times the power that is, of the ordinary cargo vessel of her size —785 gross tons.

Her towing cable can withstand a pull of 200 tons and the biggest cable—a monster Manilla 22 inches in diameter, one of the biggest ropes ever made in this country—has a tensible strength of 158 tons. On the mast of the vessel is perched a 20-inch projector searchlight, which can supplement the big arc lamps for night work.

Her wireless installation is of the latest type, and is fitted with direction-finding gear. It can receive anywhere in Europe and can send a message 600 odd miles. By its aid the Dalhousie, through ship stations, will be able to keep in constant touch with the London office. Her smoke rescue apparatus is of the latest type and her navigating gear includes the latest devices.

SCIENTIFIC INSTRUMENTS IN GREAT BRITAIN

There was recently formed in Great Britain the Institute of Physics, which gathers together all the leading men and associations engaged in the study of the constitution and properties matter. One of the enterprises of this institution is the founding of a journal to describe methods of measurement and the construction and use of instruments to carry out those methods. This new journal will be of great value to research workers and manufacturers and will also act as an incentive to the further development of scientific instruments—a field which has been cultivated already with much success by several British firms whose names are known all over the world. The new journal has the active encouragement of the British Government Department of Scientific and Industrial Research and also of the National Physical Laboratory, founded by the British Government for the carrying out of scientific tests and investigations.

IMPROVED WATER TUBE BOILER

In Great Britain the water tube boiler for both land and marine purposes has been brought to a high state of perfection, but still, in the hands of British inventors, improvements are continuously registered. One of the latest novelties in this line is a boiler specially designed to overcome one of the incidental difficulties sometimes encountered with the earlier types. The lowest tubes in the boiler are those in immediate contact with the hottest flames, and therefore, most liable to be burnt out if there is not a rapid flow of water through them. This burning out does not take place unless the boilers are being driven very hard—as they would be in the case of a sudden demand for steam. In the new type the lowest rows of tubes are provided with a separate supply of water in order to give the vigorous circulation required for safe working on emergency. Two types of boilers have been designed, one adapted for cases where water supply is very pure and the other for installations where comparatively hard water is used. In the latter case the tubes are straight so that they may be very rapidly cleaned.

Quebec.—The Donaldson liner "Orthia" which was beached after her collision with the tramp steamer "Airedale" has been salvaged, and arrived in Quebec on July 18th. The damaged vessel was successfully patched and pumped out by the Canadian Salvage Association. Gasoline pumps of huge capacity were used on the vessel. These pumps were developed in England during the war and it is the first time they have been used on the St. Lawrence. The capacity of one of these pumps is about 900 tons per hour. The cargo was badly damaged. A large portion of this was galvanized iron sheets, and after being immersed in salt water for about two weeks it is stated that it will not be fit for use.

Lubrication and Lubricating Mediums

Mineral, Animal, Vegetable and Compounded Oils—Their Subdivisions and Varied Uses—Viscosity and Methods of Testing—Selection of Oils—Oil Refining

By W. A. LUDWICK
Paper Read Before the Virginia Section A. S. M. E.

WHEN these engines were first built it was thought necessary to use a high flash oil to withstand this unusual condition. Owing to endless trouble with these heavy oils, however, they have been entirely superseded, and to-day the lighter oils are almost universally employed. The original idea was to get, if possible, a heavy, high-flash oil that would withstand the high temperature and remain a lubricant. After years of experience it has become the practice to employ a lighter bodied oil that will burn completely and not decompose when it gets into the combustion chamber.

Since there is a vast difference between the temperature of the hot gases and that of the cylinder walls, it follows that the inner and outer surfaces of the oil film will be exposed to quite different conditions. We can consider the oil film as consisting of two layers, the function of one of these being to furnish lubrication and of the other to withstand the destructive action of the heat and to protect this lubriacting layer. The surface exposed to the high temperature of these gases is, without doubt, affected by this heat, irrespective of its flash point. The outer surface is exposed only to the comparatively low temperature of the cylinder walls, and with a film of any appreciable thickness, will be protected from the heat of the burning gases. Experiments which we have made show that the flash point has nothing to do with the lubricating value of a motor oil. An examination of the flash point of the oil in the crank case, after it had operated in the motor of a car that had run fifty miles, revealed the fact that the flash was only 150 degrees F. while the original flash point was 445 degrees F. The original high flash of the oil did not indicate the sealing qualities necessary for a good motor oil, and, with this oil the seal between the piston rings and the cylinder walls was not such as to prevent the gasoline vapor from passing into the crank case during the compression stroke. This gasoline mixture contaminated the oil, made it lighter in body, and only 150 degrees F. in flash, thus proving that high flash oil would not remain so unless it possess other and more valuable characteristics, and that an oil having these essential qualifications could well be of a lower initial flash point if its flash would remain constant.

A great many purchasers of steam cylinder oils, motor oils, and gas engine oils, as well as many other lubricating oils, think that they require a lubricant having a high flash test. It has been proven in scores of cases that, when it comes to practical results for certain purposes, certain low flash point oils are greatly superior to the high flash oils, so much so that, among those well informed, the flash and fire points of properly manufactured oils are considered of practically no importance in determining their lubricating value.

Color.—In general, color is no guide as to the suitability of any class of lubricating oil for any particular work. Some pale oils are better lubricants for some purposes than certain red oils and, on the other hand, there are red oils which, for certain purposes, are superior to some of the pale oils. A high grade oil may be either pale or red, and, on the other hand, a lower grade oil may be either pale or red.

The oils of anyone refiner can, as a rule be classed generally by colors, owing to the considerable difference in crudes employed, and to the manipulation of these crudes, the products of one refiner cannot be compared with those of another on the basis of color alone.

Among the users of oil considerable prejudice has always existed in regard to color. Engineers who are accustomed to dark colored oils regard the light colored oils with distrust. The reason for this feeling is that a thin film of dark colored oil can be seen clearly, and when they use a light colored oil they think the bearings are not properly lubricated because they cannot readily see the film of oil.

The color of any oil changes with continuous use. For instance, if a turbine starts up with an extra pale turbine oil in a circulating system the color of the oil will gradually become darker, and after running for many months the oil will be a deep wine color. Should a red turbine oil be used the change takes place just the same, but is not so noticeable. In Diesel engines, oil also darkens, due largely to unconsumed parts of the fuel being washed down into the crank case. The change in color does not affect the lubricating properties of the oil, provided it is properly filtered by a special process which can be easily and cheaply installed.

When an oil changes in color through use, it does not mean that the oil is becoming worn out or that its lubricating value is being materially affected. It is simply an indication that, under the stress of service, the oil is taking up various foreign particles which affect the color. Changes in color of an oil, therefore, are due to surrounding conditions and not the oil itself.

In the case of cylinder oils, also, choice of color in the majority of cases is largely a matter of prejudice. Some engineers prefer a dark cylinder oil, prefer the bright red, filtered cylinder oil. Unless the exhaust steam is to be used for manufacturing purposes where the oil may get into the articles being manufactured, conditions which can be met by the filtered cylinder oils can be met as well by a dark colored cylinder oil and vice versa.

Odor.—This is a matter of importance, both in the case of refined oils and in the case of lubricating oils.

Lubricating oils are classified, in regard to odor, as normal and compounded. Normal neutral oils are straight mineral oils, and compounded oils are mineral oils combined with fixed oils. The different fixed oils, such as lard, rape and neatsfoot, have characteristic odors which can frequently be recognized in the compounded oil, so that it is usually possible to tell by the odor of an oil whether it is a straight mineral oil, and often, in case it is a compounded oil, what fixed oils have been used in compounding.

All straight mineral oils have a characteristic odor which when they are properly manufactured, is almost imperceptible. It occasionally happens that oils which have beeen stored or shipped in wooden barrels have a rank odor. This is due to the presence of moisture which has affected the glue used in lining the inside of the barrel. Even a small amount of moisture will dissolve the glue and cause the rancid odor. Due to modern facilities, inspection and care, it is practically impossible for moisture to get into the oil at the filling plant. Water, at times, however, does get into the barrels during transportation, and because the importance of keeping the oil barrels dry at all times is not properly understood, the barels are frequently allowed to stand on end in the open. Snow or water accumulates on the heads, and a small amount will sometimes leak through, causing damage to the oil. To prevent water from getting into the oil in this way, barrels should be stored on the side or bilge; better still, they should never be allowed to stand in the open.

Cold Test.—Nearly all oils are liquid at ordinary temperatures. In the subject of "gravity" reference was made to the fact that oils expand with an increase in temperature and contract with a decrease in temperature. If the temperature is gradually reduced from 60

degrees Fahrenheit the oil continues to contract, and finally a point is reached at which it ceases to flow. Oils made from paraffine-base crudes, which contain paraffine wax, in solution, at ordinary temperatures, cease to flow at higher temperatures than oils made from asphaltic-base crudes. This is due to the fact that wax is solid at ordinary temperatures and will, when the oil is cooled, solidify very rapidly so that the oil itself cannot flow.

There are two changes which may occur in an oil when it is cooled designed as cloud test and pour test. The cloud test is the temperature at which the oil upon being cooled becomes slightly cloudy or partially opaque from the formation of particles of paraffine wax held in suspension by the oil. This test is made only in the case of paraffine-base oils, as asphaltic-base oils contain no paraffine wax and, therefore, have no cloud test. The pour test is the lowest temperature at which the oil will flow or pour. This test is made on both paraffine and asphaltic-base oils.

The term cold test is frequently used loosely to refer to either cloud test or pour test, more frequently to the latter.

There is a fundamental difference between paraffine-base and asphaltic-base oils. In the distillation of a paraffine-base oil, the wax, which is held in suspension by the oil, is a volatile product and is distilled over with the various petroleum distillates, and the residue left in the still, after the distillation is complete, is petroleum coke. In the case of asphaltic-base oils the asphalt is not volatile and cannot be distilled, and, therefore, does not distill over with the petroleum products, but remains as a residue in the still. Therefore, while a paraffine-base oil contains paraffine wax solution, asphaltic-base lubricating oil does not contain any trace of asphalt.

There are numerous uses to which oils are put, for which a low cold test is considered essential, as for example, in the ammonia cylinders of ice machines, and for winter lubrication of motor cars. Originally the only crudes available for the manufacture of lubricating oils were the Pennsylvania crudes, which have a paraffine base, and which contain paraffine wax in solution. To free the oil from this wax it is necessary to chill the oil down to a low temperature, and remove the wax by pressing through wax presses designed for this purpose. The temperature to which the oil is congealed and the number of times it is passed through the presses control the amount of wax removed. By repeating the process a number of times at a sufficiently low temperature, enough of the wax will be removed so that the oils will have a zero cold test. Naturally the repetition of this process and the lower temperature required for refrigerating increase the expense of manufacture.

With the introduction of oils made from asphaltic-base crudes, products were brought on the market which had a natural cold test of below zero degrees Fahrenheit. These oils possess the natural advantage of being suitable for all extreme climatic temperatures. Russian oils also possess this characteristic of low cold test, but until the manufacture, in this country, of oils from asphaltic base crudes the amount of low cold test offered to the American trade was practically negligible.

The cold test of cylinder oils is always high. Cylinder oils are usually fed through lubricators that are heated or protected from the cold, and are generally not subjected to cold weather conditions. No engineer thinks of trying to remove cylinder oil from the barrel until it has been standing in a warm room long enough to thin down. Cylinder oils are not usually made lower than 45 degrees F. cold test and some run as high as 80 degrees F. The high cold test oils are usually filtered oils and are solid at ordinary temperatures, looking very much like a dark colored vaseline. Some engineers prefer these high cold test oils, as they think the oils have a heavier body, but the appearance is deceptive for the reasons that they contain a considerable amount of low melting point wax, which makes them solid at ordinary temperatures, but with a slight amount of heat they become thin. All that is necessary in cylinder oil is to have a sufficiently low cold test to allow it to flow through the lubricator, which may be exposed to drafts from windows or doors in the engine room.

The condition under which an oil is to be used determines whether or not a low cold test is essential. For general lubrication, where the oil is not exposed to low temperature conditions, a low cold test is unnecessary; on the other hand, where the oil is subjected to such conditions, a low cold test is desirable and, in some cases, necessary.

Viscosity.—In determining the suitability of a lubricating oil for any particular purpose, the most important single characteristic to be considered is its viscosity. In discussing the subjects of color, gravity, flash and fire, and cold test, it has been seen that color and gravity have nothing, and flash and fire practically nothing to do with the lubricating value of an oil. While the cold test of an oil has an important bearing upon its suitability for feeding uniformly under low temperatures, generally speaking it has nothing to do with the lubricating value, once the oil has reached the bearing surface. Viscosity, however is a matter of the greatest importance, and should always be taken into consideration, and, should, therefore, be thoroughly understood.

The viscosity of an oil is the resistance offered by its particles or molecules in sliding past one another; in other words, its internal or fluid friction. Viscosity denotes the body of relative fluidity of the oil and is determined by the time it takes a certain amount of the oil to flow through a standard sized orifice. Glycerine and castor oil are very vicous or high in vicosity, and, consequently flow slowly, while gasoline and water are low in viscosity and flow more rapidly.

The relative viscosity at atmospheric temperature of two or more oils in sample bottles can be roughly determined by holding the sample together and quickly turning upside down, then noting the drop from the bottoms of the inverted bottles. The oil which drops first has the lower viscosity or the thinner body. If they drop together the viscosity or body is about the same. Again, the samples may be shaken and the relative viscosity determined by watching the ascent of equal sized air bubbles, the more sluggish the movement the greater the viscosity of the oil.

In selecting an oil for any particular purpose the viscosity should be determined by the conditions under which the oil is to be used. The purpose of lubrication is to secure and maintain a film of oil sufficient to keep the bearing surfaces apart at working temperatures. If an oil used on a bearing is too light in viscosity at working temperature to sustain the load it will permit metal contact, with a consequent bearing wear, and loss of power. On the other hand, if an oil which has too great a body at working temperature is used, there will be unnecessary fluid friction, and again there will be loss of power. The more viscous the lubricant, the greater the bearing pressure which can be sustained. The viscosity of the lubricant should, therefore, be in proportion to the bearing pressure. Heavy, slow moving machinery requires an oil of the high viscosity; light, swift-moving machinery requires an oil of just the opposite viscosity. Also, high temperature conditions require an oil of higher viscosity than ordinary conditions. Most of the resistance or lost power in running machinery is caused by the internal friction or the fluid friction of the lubricant used. It is only occasionally through the use of an improper oil or lack of feed of a proper oil, that actual metal wear on properly constructed bearings takes place.

The general law governing lubrication is that, within certain limits a reduction in the viscosity of a lubricant will bring about a reduction in the co-efficient of friction, or, in other words, a reduction in lost power.

Carbon.—While petroleum or any petroleum product is a mixture of hydrocarbons, it must be remembered that the hyrodcarbons themselves are chemical compounds. The carbons and hydrogen are combined chemically in different proportions to form entirly new and different substances called hydrocarbons. To say that an oil contains carbon means as much as to say that a piece of chalk contains carbon or that water contains hydrogen gas. To be sure, carbon is one of the chemical constituents, but it has absolutely lost its identity, and, before the carbon can be reclaimed the compound must be decomposed or broken up into its constituent elements.

When any substance containing car-

bon is subjected to high temperature without a free supply of air, the substance may be decomposed. If so, the gaseous elements are liberated or combined with other elements to form new compounds, and a residue is left which is chiefly carbon. In most instances, however, this would not be pure carbon, but would consist of various other substances as well. Since this decomposition takes place to a greater or less degree when lubricating oils are subjected to certain conditions, the question of the decomposition of hydrocarbons and the deposit of carbon as a residue is an important one in the lubricating problem.

There is a popular idea that all deposits from a lubricating oil are due to carbonization. This, however, is not the case, as the deposits which are sometimes found in bearings or oiling systems are due to ordinary wear, and consist of small pieces of metal due to metallic wear or iron rust combined with dust and deposits from the surrounding air, and do not contain carbon from the oil unless the bearing has burned out. In the case of steam cylinder lubrication the deposits are due rather to boiler-water impurities and to small amounts of metal mostly from rust, which are bound together by the oil. In course of time this oil partially evaporates and decomposes, leaving a hard deposit which contains only a small amount of oil and a relatively small percentage of carbon. An analysis of an average deposit from a steam cylinder might show that the residue contained 2 per cent. of unchanged oil 1 per cent. of decomposed hydrocarbons, 7 per cent. of carbonaceous matter of carbon, and 90 per cent. of ash, consisting of metallic substances, rust, boiler impurities and dirt.

While the deposits found in an internal-combustion engine are by no means all carbon, still the percentage of carbon in the deposit is large, and it is in this case that the question of carbon deposits is of the greatest importance. Any deposit in the cylinder and on the top of the piston, also on the valve cause a great amount of inconvenience and damage, and, therefore, special stress is laid on the amount and nature of the carbon deposited in use for internal-combustion work.

BRITISH PORTS

Liverpool and Birkenhead.—The docks and harbors are controlled by the Mersey Docks and Harbor Board.

From the Gladstone Dock at the north end of Liverpool to the Herculaneum Dock at the south, the river is fronted for a length of about 6½ miles by a system of docks and basins, having a water area of over 430 acres and lineal quayage of over 27 miles of every imaginable type and variety, from the gigantic accommodation necessary for the ever-increasing sizes of Atlantic liners to the lesser requirements of the small coaster.

On the opposite side of the river the Birkenhead Docks, having a water area of 172 acres and 10 miles of quayage, form part of the whole Mersey system, and present the same features of progressive modernism.

In 1906 the Harbor Board obtained parliamentary powers for the construction of new docks at the north end of their Liverpool estate. The work—in abeyance for a time owing to the war and other causes—is in progress again, and the scheme embraces:—

(1) A vestibule dock, with a river dock entrance of 1,070 feet in length, and 130 feet in width, and having a sill of 20 feet below datum. This will provide a depth of water on sill of 48 feet 2 inches at H. W. O. S. T. Special facilities consisting of a light single storey shed, provided with two sets of railway lines connected up with the principal railways, are to be provided on the West quay of this dock for liner passenger traffic.

(2) A lock 645 feet long and 90 feet wide between the existing Hornby Dock and the aforementioned dock. This work has been completed and water admitted into the lock.

(3) A branch dock (to be called the Gladstone branch dock No. 1), opening out of the vestibule dock and immediately to the north of the present timber storage ground and having treble storage sheds on the north and south sides.

(4) A branch dock (to be called the Gladstone branch dock No. 2), also opening out of the vestibule dock to the north of the proposed Gladstone branch dock No. 1, and having treble storage sheds on the north and south sides.

The work of providing additional accommodation at the Princes Landing stage is in hand and an extension of the Georges Landing Stage has been completed.

At the base of the cliffs, on the East and south sides of the Herculaneum Dock, chambers have been excavated in the solid rock for the special purpose of effecting a safe and convenient means of storing petroleum in barrels. These magazines are each about 50 feet long, 20 feet wide and 19 feet high, and are separated by a wall of solid rock 5 feet thick. The magazines are capable of containing 60,000 barrels of petroleum. For storage in bulk, tanks have been erected with a total capacity of 12,500 tons, or about 80,000 barrels. Pipes are laid from the west quay of the Herculaneum Dock to the tanks, which are filled by means of the ships' pumps. The filling of the barrels by gravitation is carried out on the terraces below the tanks.

The tanks are surrounded by moats capable of containing the whole contents of the tanks in case of accidents. With the object of providing immediate and ample accommodation at Liverpool for the rapidly growing oil trade, the board have recently decided to open out a large area of their own land for the requirements of this particular trade. The land will be leased to certain of the leading oil companies for the erection thereon of oil storage tanks, with the object of supplying fuel oil for bunkering. The tanks will be connected by pipe-lines to the berths in the Herculaneum Dock, where vessels of up to 500 feet in length can discharge the oil, by their own pumps, direct into the storage used for carrying the oil to the docks where tank steamers, etc., can be loaded.

The most modern appliances are tanks. The same pipe-lines will also be available for the bunkering and loading of steamers. Coal shipments are conducted day and night, a complete electrical installation being in operation sufficient to light the dock entrances, coal hoists, quays, sidings and storage area, as well as the extensive shunting and marshalling yard on the estate. This system of lighting is also extended to portable lamps for use in the holds of vessels where the nature of the cargo will permit.

A fine range of coal tips at the Stalbridge Dock is a great factor in ensuring despatch. The coalfields and manufacturing districts in Lancashire, Staffordshire, Yorkshire and the Midlands are in close proximity.

The warehouses of the board present features at once striking and unique. Sailing up the River Mersey, the most important building to be seen on the dock estate is the tobacco warehouse in Stanley dock, which, with a total floor area of about 36 acres, is probably the largest warehouse in the world. The building consists of fireproof floors, especially constructed for the storage of tobacco, which are capable of storing about 70,000 casks.

In 1919, no fewer than 195,000 packages of tobacco were stored at the port at one time.

Special warehouse accommodation has also been provided by the board for the storage of grain, both at Liverpool and Birkenhead. The warehouses at the East Waterloo Dock, on the Liverpool side of the river, have a capacity of about 30,000 tons of grain, in addition to the large quay for the landing, etc., of goods. The grain warehouses at Birkenhead have a storage capacity of about 30,000 tons of grain. These warehouses are fitted with hydraulic and electrical machinery, lifts, bands, elevators, etc., for the proper and expeditious handling of grain, which can be stored either on floors or in silos.

The wool warehouse is situated a little to the East of the new tobacco yards, and has an actual storage capacity of 160,000 bales of wool. The top floor is provided with a weaving shop roof specially constructed to give a good north light for the convenience of wool buyers. A new warehouse for the storage and working of Colonial wool which will accommodate 85,000 bales has just been completed in Love Lane, Liverpool.

Accommodation is provided for about 6,600 head of cattle and 22,000 sheep, with extensive chill rooms with a capacity of 3.380 carcases, and slaughter-house rooms for 3,400 head of cattle and

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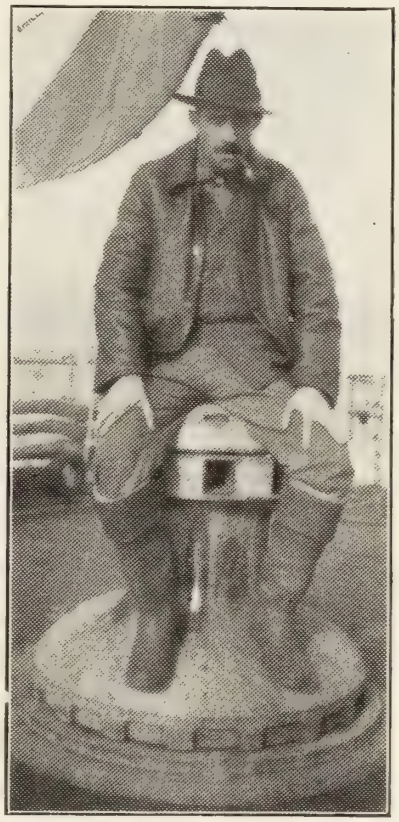

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BRITISH PORTS

(Continued from page 20)

house rooms for 3,400 head of cattle and 3,000 sheep per day. All the recent requirements in connection with this extensive trade have been introduced, and it is generally acknowledged that the Mersey cattle wharf is the most complete and best appointed in the United Kingdom. The animals and carcases of animals slaughtered here are distributed all over the United Kingdom.

Liverpool being the gateway of the Atlantic, it is only natural that a large number of ships trading with Canada and the United States of America should return with food products. The port is admirably equipped for the handling of all kinds of general cargo. In addition to the many facilities provided by the port in the effort to make it complete in all equipment it should be mentioned that tenancies have been granted on the estate whereby engineers, ship store dealers, repair shops, etc., are brought conveniently near for the benefit of steamship companies who wish to take advantage of the loading and discharging days in order to effect slight repairs and alterations without causing delay to vessels.

Considerable advancement has been made at the port in the shipbuilding industry, and one well known firm provide one of the most up-to-date and best equipped shipbuilding establishments in the country. Their premises extend to 76 acres and contain a launching slipway, wet docks for repairing purposes, graving docks, engine erecting, machine and numerous other shops and appliances.

The London and North Western Railway Company control the entire railway workings of the dock, which are, of course, directly connected with that company's main line system, and through the latter with the systems of all the railway companies in the country. There are about 70 miles of sidings in the port, of which eight miles are actually on, or alongside, the quays, and, therefore, available for a direct working of cargoes from ships to trucks, or vice versa. The railway company has two passenger stations on the estate.

Southampton.—Southampton was established by the Romans as a port for the City of Winchester nearly 19 centuries ago. It is situated on the South coast of Great Britain at the confluence of the rivers Test and Itchen within the shelter of the Isle of Wight. Prior to the opening of the first Southampton dock in 1843, extensive and well-equipped wharves had been in use. The opening of the first docks, however, gave the port development great impetus, and further facilities were provided from time to time by the Southampton Harbor and Dock Board, who, for many years, had sole responsibility for the harbor and dock accommodation. In 1892 the London and South Western Railway purchased the dock estate from the Harbor Board, and during the past 30 years a policy of rapid expansion and development has been adopted by the railway company.

Modern docks, a sheltered harbor, four tides a day, safe approach channels, deep waters at all states of the tide and its proximity to London, all combine to make Southampton the ideal home port for the great vessels engaged in the passenger carrying trade. It is therefore, a natural consequence that the important steamship companies have selected and regularly use Southampton as the home port for their mammoth ships. At no other port in the world can such vessels be berthed at any hour of the day or night.

For years before the war, Southampton enjoyed the distinction of dealing with the largest liners of the principal steamship companies and when the port was released by the Government for commercial purposes it regained at once the premier position amongst British ports in respect of the ocean passenger trade. The distance between Southampton and London is only 78 miles and special trains make the journey between the quayside at Southampton and the London terminus in about 1¾ hours.

It is recognized that a large port is not properly equipped unless it has adequate facilities for the rapid bunkering of steamers, whether consuming coal or oil. A coal jetty with hydraulic and electric power cranes and spacious coal barge docks has been constructed on the Itchen, for the purpose of storing coaling lighters for bunkering out-going liners. These coaling docks are capable of floating 20,000 tons of bunkering coal at one time. The best Welsh coal is received by coastal steamers, or by special trains from the South Wales coalfields. Special facilities are also provided for oil bunkering and the leading oil companies have constructed large installations of oil and motor spirit. The great increase in the number of modern steamers consuming oil fuel, particularly the largest class of liners, has demanded special facilities for replenishing bunkers and adequate arrangements have been made to meet these requirements. Several of the principal oil fuel companies have opened branches at the port. Large Atlantic liners such as the "Olympia" and the "Aquitania" have fuelled under 7 hours. It is expected that in the near future it will be possible for vessels to be oil-bunkered whilst lying in their berths in the docks by means of pipelines laid on from the various companies' tanks.

The docks and quays at Southampton are fully equipped with a complete system of loading, discharging and operating appliances. The cranes have a lifting power varying from 1 to 50 tons and steam sheers have a lifting capacity up to 80 tons. The docks, quays, sheds, and approaches are lighted throughout by electricity.

The railway sidings on the docks connect all quays and warehouses. Special equipment has been provided for the grain trade, the elevators being capable of dealing with 200 tons per hour from ship, lighter, or railway truck. Spacious transit sheds have been constructed for the reception of import and export cargo. There are also bonded or free warehouses for the storage of tobacco, cigars, etc., and commodious vaults and stores for the housing of wines and spirits under bond, with every facility for bottling.

The channel from the Solent to the docks has been dredged to a depth of 35 feet below L. W. O. S. T., and is lighted by gas buoys. There are double tides at the port, with the result that the water remains at high tide level for about 2 hours twice daily. The docks and quays are fitted with hydraulic and electric installations and provide for numerous cargo sheds and warehouses, also with sidings connecting with the London and South Western Railway main line.

A large installation of cold storage is now in operation for the direct importation of meat and fruit, ships being able to discharge right alongside with a depth of water of 32 feet L. W. O. S. T.

Although a new and recent venture so far as Southampton is concerned, a large business is now being done at the port in connection with the American and Spanish fruit traffic, special cargoes of which arrive 6 or 8 times per month. To accommodate this fruit trade, some of the berths in the inner dock have been specially prepared. Immediately behind the quay is a shed 600 feet long and covering an area of 68,000 square feet with an annexe containing 34,000 square feet. At one end of the quay has been built a fruit sales room and offices, where periodical auction sales are held. These sales are attended by the largest fruit merchants in the United Kingdom.

The dock and quays are equipped with every modern facility for dealing with all classes of imports and exports.

The port is connected by special services with all principal ports in the United Kingdom. The rapidity with which Southampton has gained popularity throughout the shipping world is owing, to a considerable degree, to the excellent railway facilities to and from the port, not only for passengers, but also for goods and all kinds of perishable merchandise. Several ship repairing firms have built workshops within the docks with appliances for executing repairs of all descriptions.

Halifax.—At Halifax on June 30th, H. M. C. S. "Aurora" was taken out of commission and her crew consisting of twenty-three officers and two hundred and eighty men were paid off. Five officers and two hundred ratings left for Montreal on July 3rd and sailed for England on the Canadian Pacific steamer "Minnedosa" on July 5th. The submarines Ch 14 and 15 have also been laid up, leaving the two destroyers of the former Canadian Atlantic fleet of five vessels.

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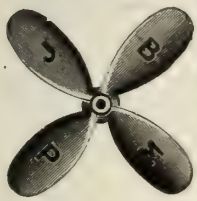

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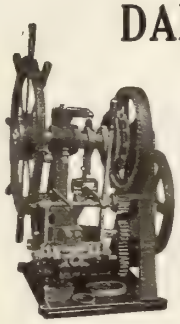
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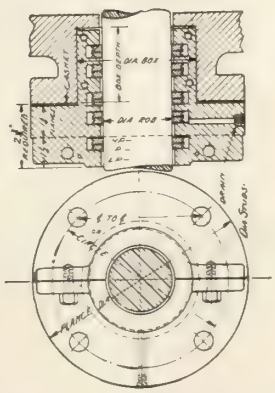
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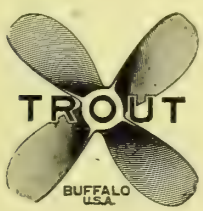

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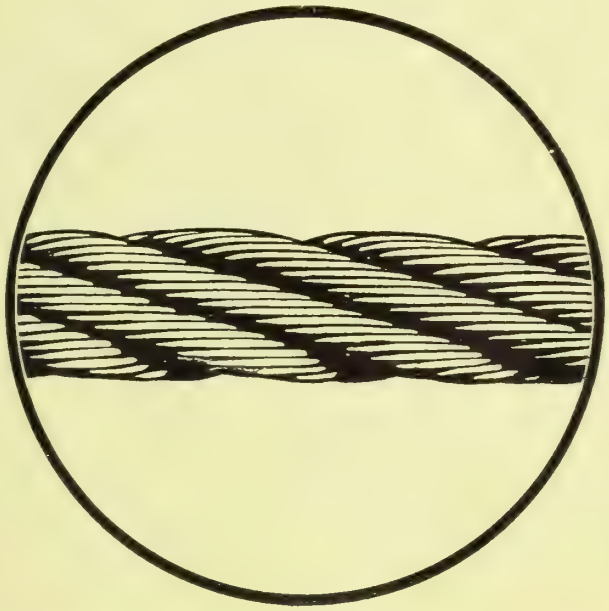

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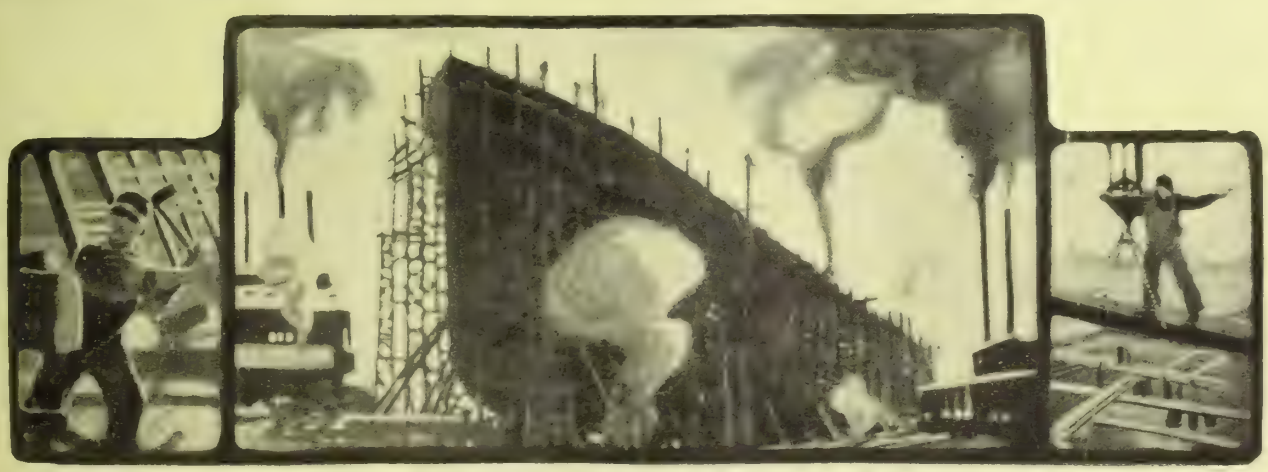

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News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

THE SHIPPING trade of the port of Quebec has shown some slight improvement this season in comparison to 1921. This is chiefly due to the timber trade, which has been 50 per cent. better this year than last. The shipments, which have been made in fulfilment of orders secured last winter in the United Kingdom, came to an end on August 15th, and no other orders are expected this summer and fall. The slump in the timber trade is entirely due to the high cost of ocean freight the rate being only 15 shillings below the war time charge. The Quebec shippers had been in hopes that the steamship companies would have issued on August 1st as is the rule, a revision of freight rates, that would have been a revision downwards. These expectations were not realized. Unless the rates come down to between 55 and 60 shillings for next season of navigation, the Canadian lumber trade will be unable to compete with the European shippers.

Over 500,000 bushels of wheat have been shipped up to date from Montreal, and not one bushel from the port of Quebec. The Quebec Harbor Commissioners have used every effort to secure a share of the grain export trade from their port, but without avail. It appears as though the movement of Canadian grain is entirely controlled by the shipping interests of Montreal, who would rather see it diverted through American ports than see Quebec get a share of the trade. This assertion is not made through any want of knowledge of the situation or from any prejudice to the Montreal interests, but is based on incontrovertible facts. There is no jealousy of Montreal in Quebec, the entire business community of the city wishing to see Montreal and every other Canadian port grow and prosper. There is sufficient business for all Canadian ports if the grain were not diverted to American ports.

The appointment of the Canadian Elevator Board and giving its control to three Montreal men, including Mr. Fennell as chairman, is significant. Mr. Fennell is the secretary of the Montreal Harbor Commission. The Wheat Moving Board to prevent congestion also includes Mr. Fennell.

The Elevator Board appointed by the government is to inspect all Canadian grain elevators, take cognisance of their capacity and advise the government on their condition, etc. The Wheat Board appointed in regard to the movement of Canadian grain is to prevent congestion at ports. This board has extraordinary powers as far as protecting the interests of Montreal is concerned. It can check the grain at the Georgian Bay elevators and not allow the port of Montreal to become congested. Consequently there will be no overflow to reach the port of Quebec. The board in taking care of Montreal's interests will allow the congestion to take place at the Georgian Bay elevators, with the ultimate result that the excuse to ship the Canadian grain to Buffalo will exist.

More accidents have occurred to shipping this season than any season in the past decade. The most recent accident was a collision between the French steamer "Indo-China" and the British steamer "Sarmatia," which occurred in the channel opposite Three Rivers. The accident nearly resulted in the channel which is narrow at this point being blocked, which would have bottled up the port of Montreal for weeks. The two vessels were proceeding in opposite directions, and the curtain of smoke that hung over the river at the time is blamed for the accident. The "Sarmatia" was struck amidships, and a hole made in her side close to the engine room. She was beached quickly on the south shore 300 yards from the channel, and the danger of a block avoided. The "Indo-China" though not so badly damaged was also put ashore and at the time of writing the two ships were still ashore. There was considerable anxiety in Montreal when the news of the collision was wired through and the Department of Marine and Fisheries also became active, and gave orders that no attempt was to be made to float the vessels until it was assured that there would be no danger of them sinking and blocking navigation.

The collision which took place between the two freighters "Airedale" and "Orthia" on July 4th, off White Island, in the lower St. Lawrence, has resulted in the condemnation of the "Orthia" which has since been sold for scrap.

H. M. S. "Raleigh" which went ashore close by Point Amour in the straits of Belle Isle during a dense fog was still aground in the position on Aug 13th when the wrecking steamer "Lord Strathcona" and her equipment arrived. The superintendent of the Quebec Wrecking and Salvage Co., has hopes of being able to salvage the vessel. The spot where she went ashore is about 678 miles from Quebec, and the straits are eleven miles wide at that point.

The Coal Situation

Shipments of Welsh and Scotch coal are now arriving in the city, and the dealers are not so pessimistic in regard to the outlook as in some other parts of Canada. The leading coal dealer in Quebec in reviewing the coal situation said: "During the war and previous coal shortages in the United States, we were warned against a possible shortage. Still the people of Quebec, and I might say the whole of Canada, received their supply of coal. From advices I have received from well-informed circles, the present strike will come to an end before the last of August. This will give us two months and more to bring in anthracite from the United States in barges, and we can handle all the coal required for winter consumption during this time. Notwithstanding the statements given out by the coal union leaders, and copied broadcast in the press, the mine workers are well fed up with the strike, which they were told would only last a couple of weeks, and are now anxious to return to work.

Their strike pay is now about nil, and besides they are beginning to see through the veneer of their leaders, who are living on the fat of the land at their expense. When the strike is called off, I look for a victory for the coal operators, who are determined not to meet the wage demand of their employees, and an energetic production at the mines which will in the course of a few months ease the situation, and with the coal in storage supply all demands. In the meantime considerable Scotch and Welsh anthracite ordered to meet the contingency, is now on its way to Canada and the United States, and I do not see where the coal should be any dearer than last year. In fact it should be cheaper with the decrease in freight rates. Of course there are dealers who will take advantage of the scare produced by the strike, which has even extended to the government and municipal corporations. A study of the market improved production and reduction in wages and freight charges should cause coal to be less in price than it was last year, and dealers who demand higher prices will be profiteering."

The Icebreaker "Hazen"

The former Canadian government icebreaker "Hazen" sold by the Marine and Fisheries Department during the war in 1917 to the Russian government, arrived at Quebec on August 6th, under command of Capt. Hearn of the Canadian Marine Service. She is now under orders to remove her boats, etc., and place them in storage, and then proceed to Sorel for repairs. The "Hazen" was lying idle in the port of Archangel, when the Canadian government purchased her for $400,000 with the proviso that she was seaworthy and passed a Lloyd's survey. This was done at Cherbourg, France, where she was taken under her own steam from Archangel. The icebreaker was purchased through a broker, who guaranteed her seaworthy and capable of good service. When she was docked in the French navy dry dock at Cherbourg, it was found that she had been altered into a regular ship of war, for the performance of her duty in keeping Archangel open during the winter months. She required considerable overhauling before being accepted by the Canadian government. This occasioned an expense of $50,000 which the broker had to meet, and then Lloyd's surveyor classed her A1. It took the "Hazen" thirteen days to cross from Cherbourg to Quebec and the officers reported that she rolled heavily all the way across, and that the electric lighting and other equipment showed deficiency.

It is considered rather strange by the shipping men of Quebec, that the Minister of Marine and Fisheries should send the vessel to Sorel, when the government dry dock at Levis in connection with the Davy Shipbuilding Co., was available, as there is no large dry dock at Sorel.

The coasting trade between Quebec and the lower St. Lawrence and Gulf, is picking up and the Clark Steamship Co., with its three boats, two on the north shore, and one on the south shore, taking in all eastern ports, are beginning to attract attention and do a good business. The steamer "Gaspesian" purchased in England by the company, is meeting with success as a passenger carrier, and freighter. She arrived recently at Quebec with her full passenger accommodation of tourists, and a full cargo in well packed barrels, sold to a produce importing firm located in West Africa. The Clark Steamship Co. are well aware of the rich results to be derived from the development of the lower St. Lawrence, and expect to open up a big trade in the next few years, when they will have to add to their tonnage. The Clark brothers are young men with energy and a spirit of enterprise, who mean to be established in the field when the inevitable development occurs.

St. John, N. B.

THE Port of St. John experienced exceptional renewed activity during the latter part of July and the first week in August, during which period numerous steamers arrived. The activity was mostly due to the sugar cargoes moving for account of the local refinery. On July 25th there were seven ships in port, some taking on cargoes of sugar, others discharging raw material from southern points.

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About that time the Chebaulip loaded a cargo of refined sugar for Scandinavian ports, this being the first shipment from the local refinery for those points.

The S. S. Wekika loaded a cargo of refined sugar for Bristol and Cardiff.

The Hambleton Range took part cargo of refined for the United Kingdom.

The Katanga loaded a cargo refined for Montreal.

The Malagash loaded a cargo refined for Genoa.

The Dorothy discharged cargo of raw sugar from San Domingo.

The Victory discharged raw sugar.

The Britsum discharged raw Cuban.

The West Noska, Eastern Leader, and Evare took part cargoes of refined sugar for England.

The Malagash, which discharged a cargo of fertilizer, loaded a cargo of refined for Genoa.

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The first square rigged vessel to enter the port for some time was the barkentine "Maid of England," which brought a cargo of salt from Turks Island. She made the run up in thirteen days.

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The S. S. Grey Point, Captain McKay, arrived from Belfast and was taken over by new owners, the Kirkwood Line Ltd. The captain and crew returned to Ireland on one of the Head Line steamers from Quebec.

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The Grey Point loaded 20,179 bags of refined sugar for Quebec and Toronto.

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The schooner Ada A. McIntyre which went ashore at Grand Manan and which was brought to St. John, was made sufficiently tight and towed across the bay to Metelghan where she will be repaired on the Marine railway.

Bathurst, Aug. 4.—The Norwegian steamer Times cleared from the port of Caraquet on July 31 with a cargo of pulpwood consigned to a large paper firm at Richmond, (Va.).

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The old craft "Granite State," originally the frigate New Hampshire, which did duty during the United States civil war, was burned recently off Marblehead. For nine years the Granite State has been anchored in New York harbour, where she was used by New York state naval militia as a practice vessel. The vessel was recently condemned and sold for junk and was being towed to a point near East Port where she was to be beached and burned for the metal in her hull. The burning however, occurred prematurely in some mysterious manner.

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The schooner Gilbert Stancliffe, bound from Parsboro for Boston, recently became waterlogged in the Bay of Fundy. While crossing the bay a sudden squall carried away the after house and did other damage. The hold gradually filled with water and the cargo of lumber kept her afloat. The crew had abandoned the vessel and rowed for Mispec. The next day the schooner was sighted and towed in, and sufficient repairs were made to complete the voyage.

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The largest monthly customs receipts ever collected in the history of the port were collected during the month of July. The sum collected was $820,604.89, which was an increase of $85,469.49 over July, 1921. Each month this year has been an increase but July capped the climax.

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Although the imports of the local sugar refinery had a lot to do with the matter business of every kind seemed to be picking up.

July, 1922

Customs import duty	$732,648.72
Sundry collections	301.67
Excise tax	76,374.65
Excise duty	8,116.88
Pilotage dues	2,315.25
Steamship inspection dues	100.00
Marine dues	747.72
	$820,604.89

The C. G. M. M. steamer Canadian Pioneer, which struck an iceberg July 24, east of the Straits of Belleisle, arrived in North Sydney, Wednesday 26th. Temporary repairs were made to enable the steamer to resume her trip from Montreal to Liverpool. The ship's starboard bow plates were badly sprung and the fore peak framework twisted. Permanent repairs on the other side, will, it is estimated, cost $15,000 to $20,000.

Failure of a Miquelon lighthouse to operate its siren during a heavy fog, or conditions which prevented the horn from being heard, combined with an unexpected strong current setting in towards the land, were given as the reasons for the grounding of the C. G. M. M. Canadian Commander, by the captain and chief officer of the ship, testifying before the wreck commissioners' court held in Montreal. The grounding of the vessel occurred on July 3 in a bay near Platte Point, Little Miquelon Island.

Halifax Notes

THE PAST month has been a very quiet one at Halifax, but it is expected that there will be improvement from now on. With the apple export season aproaching the prospects are bright. The Furness Liner Digby when she sails for Liverpool via St. John's the latter part of August is expected to take the first shipment of apples this season for the United Kingdom.

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While through the Strait of Canso the French tank Titan went aground, refloated herself and proceeded to Halifax. Temporary repairs were made and the ship will be permanently repaired on her arrival on the other side of the Atlantic.

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The experiment of shipping cargoes of pulp from the ports of Digby and Shelburne, have proved so successful that in future all pulp from the Weymouth and Port Clyde mills will be shipped through these ports.

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The stranding of H. M. S. Raleigh, Flagship of the North Atlantic Squadron, was greatly regretted at Halifax as the ship had visited this port on several occasions and many of her officers and men were well known here. Along with the other ships of the squadron, the Constance, Calcutta and Cape Town, the Raleigh was scheduled to arrive at Halifax on August, 24.

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The event of the month of August at Halifax was the visit of the United States Midshipman Practice Squadron. Arriving on August 1 the ships of the squadron, including the battleships Florida. North Dakota and Delaware and the cruiser Olympia, remained twelve days. Rear Admiral Newton A. McCully, commander of the Control Force, Atlantic fleet, was in charge of the squadron and the seventeen hundred midshipmen were extended a warm welcome.

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The announcement by the Leyland Line that they intend opening a freight service from Halifax has been made at the opening of the apple season and it is evident that this line is competing for some apple cargoes. They plan to have at least a sailing a month and while the United Kingdom port has not been announced, it is believed that their ships will load here for either London or Liverpool.

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Repairs to the Norweigan steamer Sangstad, which stranded last month on Seal Island, were completed at the Halifax shipyards early in August and the ship sailed for her destination after loading a cargo of refined sugar.

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Already apple sailings are being arranged and it is predicted that as Nova Scotia is expected to have as large if not a larger crop than last year the export through the port of Halifax to the markets of the United Kingdom will be a record one.

A NEW SHALLOW-DRAUGHT VESSEL

Many solutions have been offered to the problem presented by the shallow-draught vessel driven by mechanical power. Side paddle wheels and stern paddle wheels have been adopted. Screw propellers have been used in tunnels which become filled with water as the vessel moves along and thus completely immerse the propellers; water jet propulsion and air screw propellers have also been tried. Now we have from a leading British ship-building firm quite a novel solution for which many advantages are claimed. What are termed vane wheels are used. These are partly immersed wheels with their axis well above the water line. They are fitted with vanes which enter the water at the lower part of the revolution and are so covered as to give a forward thrust to the vessel. Two of these wheels, each with three vanes, are placed at the stern of the vessel and are spaced so as to propel the vessel straight ahead. Tests have been made with these wheels on a vessel designed for twin screws and they show a great reduction in the power required to give a certain speed. The vane wheels, in fact, show an efficiency of nearly 70 per cent., which is very high compared with other systems. One advantage of the arrangement is its remarkable manoeuvring power. When one wheel is driven ahead and the other astern the boat turns on its own centre, and when one wheel is in operation and the other steady the boat can be manoeuvred as easily as a twin screw steamer at its best.

A HUGE OIL REFINERY

During the last three years a British oil company has been occupied in completing one of the largest oil refineries in the world. This refinery occupies a site of about 650 acres near a British port, and it has involved the expenditure of about three million pounds. From the jetties where the tank steamers are unloaded pipe lines are laid down to eight tanks, which are capable of holding ten thousand tons of oil. Electrically-driven pumps are used to convey the oil from these tanks to storage tanks situated at the refinery about four miles away. The storage tanks have a total capacity of nearly twenty-one million gallons. With this up-to-date equipment a ten thousand ton oil tanker can be unloaded in about twelve hours, and can be reloaded with refined oil in twenty hours. In fact, oil arriving at the dock one day can be returned as refined on the third day. When work was begun, the refinery proved itself capable of dealing with fifteen million gallons of oil per month; but in course of time this figure will be greatly increased. This is the first occasion on which an attempt has been made upon a commercial basis to refine crude oil several thousand miles away from the source of production.

AN EASY STARTING OIL ENGINE

Right through the history of the oil engine the difficulty of starting, especially when the engine is cold, has occupied the attention of inventors. Hitherto the most popular way of getting over the difficulty has been to use a high grade oil of the petrol type for starting and, after the engine has got going, to change over to the crude oil which forms the cheapest fuel for such prime movers. This arrangement, however, is really only a make-shift, and engineers have felt that the problem would not be really solved until an engine was designed to start "from cold" on crude oil. This problem has now been solved by a British firm. The new engine, after receiving the usual first impulse from compressed air, starts right away with the heavy fuel oil of the quality generally used in running. In point of fact, any fuel which can be pumped is suitable for this engine, which has been satisfactorily running on tar oil and even on sewerage grease. This grease is in the form of a thick paste and has to be warmed before it can be pumped. The engine is of the horizontal four cycle type, and is of exceedingly simple and robust construction. The single cylinder type is made in sizes ranging from 20 to 150 brake horse power, and the two cylinder type go as high as 300 brake horse power.

Current News of The Ancient Colony

Special To "Canadian Shipping"

FOR THE second time within the half century, Point Amour, on the eastern side of Forteau Bay, Straits of Belle Isle, Labrador, has claimed a ship of war for its victim, and as a sacrifice to Neptune, who is supposed to have his northern domain within the bounds of these same straits. Human life in both cases has been offered up, and out of both men-of-war eighteen souls have been the sacrifice. In the year 1889, Her Majesty's corvette "Lily" whilst steaming through the Straits in a dense fog and a high gale of wind, piled up on the rocks in exactly the same place where thirty-three years afterwards, His Majesty's light cruiser "Raleigh" under similar foggy conditions, but without the wind, took ground and remained fast. All the ship's company of the "Lily" with the exception of seven doomed men, got safely to shore, and were subsequently taken off and brought to England. Nothing else of the equipment was saved. The toothed rocks of Point Amour had too sure a hold on their victim to grant release. It may be the same with the "Raleigh" from which ship eleven precious lives were taken as toll when the ship struck at 4 o'clock on the afternoon of Tuesday, August 8th.

H.M.S. "Raleigh" Entering St. John's Harbor.

The Stranding

At 11 o'clock on the morning of Wednesday, the Marconi wireless telegraph agent at St. John's was apprised by radio of the stranding of H. M. S. "Raleigh" at Point Amour, on the eastern side of Forteau Bay, Straits of Belle Isle. Immediately the news of this unusual marine casualty was broadcasted to all stations. Later came the intelligence that all the crew had landed safely, with the exception of eleven men who were reported missing. The ship had left Bay of Islands some days previously, bound to Forteau, and the message received read as follows: H. M. S. "Raleigh" struck at 4 o'clock on Tuesday afternoon, August 8th, during a very dense fog, on a shoal about a quarter mile west of Point Amour light, while bound to Forteau. The crew of seven hundred men are all ashore, excepting, so far as is known, eleven who are missing. The ship is lying easily about two hundred yards from shore. Her water line is a few feet under the surface at the bow, and the same above at the stern. Extent of damage to bottom is not known, but apparently the ship is in no great danger. Crew are quartered ashore and are salving provisions from ship. Wireless service is in a position to render good assistance. Such was the first intelligence of the disaster to one of the finest and most modern light cruisers of the British Navy.

The Ship

The "Raleigh" was 605 feet long, 65 feet beam, and 21 feet draft. She carried a battery of 7.5 and 3 inch guns, and was one of the fastest light cruisers in the British Naval service, being capable of making 31.75 knots, or about 35 miles per hour under forced draught. The ship cost approximately $15,000,000 to build and place in commission. She was built during the war to hunt German raiders, but after launching was reported to be too costly for a light cruiser, and too light for battle cruiser squadron service. Her armament was much heavier than was usually placed on light cruisers, with the object that it would outrange the guns of any common raider the enemy might send out. The ship was also equipped with anti-aircraft guns and was provided with bilges designed to make her torpedo proof. Other improvements in her construction were arranged so that any two compartments could be flooded without endangering her. But the granite rocks of Point Amour set the designs of Admiralty as architects and constructors at naught.

Admiralty and Officers

The "Raleigh" was the flagship of the North American squadron, and flew the flag of Rear Admiral Sir William Pakenham. Her consorts were the "Calcutta" "Constance" and "Cape Town." All were cruising through the Straits of Belle Isle when the accident happened, and were scheduled to arrive at Halifax on August 24th, on the annual visit of the squadron to that port. They were due to arrive earlier, but had changed their itinerary to enable them to make a run up the St. Lawrence River first. Rear Admiral Pakenham was on board at the time of the stranding, but has since changed his flag to the "Calcutta," which is at present writing standing by, as is also the "Cape Town." His staff is as follows:—Secretary-paymaster, Commander Cecil A. Ward, C. M. G; flag lieutenant, Leicester C. A. St. J. Curzon-Howe; flag captain and chief of staff, Capt. Arthur Bromley, C. M. G.; C. O. S. paymaster, Lieut. Edgar Haslehurst. The officers are: Commander, Stewart D. Spicer; major, R. M. L. I., Walter Sinclair; captain, R. M. L. I., Francis R. Jones; paymaster, Lieut. W. H. W. Winn; paymaster, Lieut. Felix R. Porter; commanders, Ronald M. Fraser and Leslie C. Bott; lieutenant commanders, Massey Goolden and Edward W. H. Blake; lieutenants, S. F. G. St. Lawrence, Denys O'Callaghan, L. E. Smith, H. G. Hope, M. H. M. Durand, R. C. O. Hill, David R. Ewing, J. A. Grindle; engineer commander, John Wisdom; engineer lieutenant, Harry E. Poidevin; chaplain, Rev. Guy H. Harcourt; temporary instructor. Lieut. R. E. Shaw; surgeon commander, W. W. Keir; paymaster, commander Ernest W. S. Pellowe; surgeon lieutenant, H. R. B. Hull; Assistant paymasters, Lieuts. Basil D. Reid, R. H. Nicholson; sub-lieutenants, Chas. E. Lambe, Maxwell Cunningham.

Cruising in Straits

The "Raleigh" had left Bay of Islands a few days previous to the accident, and was bound on the usual cruise first to Forteau, and then through the Straits along the North East coast of Newfoundland to St. John's. At the extreme western entrance to the narrow water which separates Newfoundland from Labrador, she ran into a dense fog, and though all the care to which naval officers are accustomed in navigating their ships was exercised, yet in some unaccountable way the rocks of L'anse Amour, about a quarter

mile from the point, picked her up. An extraordinary feature of the occurrence is that at Point Amour there is a powerful light and fog alarm, both maintained by the Canadian government, and at first sight it appears singular that the latter was not heard by those on board the cruiser, particularly when she was so near, but in explanation of that failure to detect the sound, the Newfoundland "Pilot" Volume 1, 5th edition, 1917, has this to say by way of caution to navigators:—"Reliance should not be placed on hearing this, (Point Amour) fog signal, as sometimes from unexplained causes, the sound cannot be heard, even from short distances." There is no doubt, whatever, that the officers of the watch and lookouts on the "Raleigh" failed to hear the alarm, hence the accident. Then again with a strong tide such as flows and ebbs in the Straits, and the ship going dead slow, the course may have been deflected without the knowledge of the officers of the watch, quartermaster or wheelsman, and more especially as the weather was exceedingly thick such deflection would not be perceptible.

Hope of Salvage

At the moment of writing there is good hope of being able to salvage the ship. The crew are standing by, but it is expected that most of them will be sent to Southampton, only a working squad to assist the salvage party being retained. The wrecking and salvage flotilla will, in all probability, come from Halifax and Bermuda. The sea in the vicinity of the stranded vessel continues smooth, and already much equipment has been removed, in order to lighten the hull. Three of the missing men's bodies have been recovered and given Christian burial. No new developments have occurred, the salvage conditions being apparently unknown to those not belonging to the ship. Illustrations of the wrecked warship, accompanying this article, are from photos by Messrs. Dicks & Co., Ltd., taken when the "Raleigh" was at St. John's some time ago.

Nothing in Marine Circles

There is nothing special worth reporting in Marine circles for the port of St. John's during the month past. The arrivals and sailings of both steam and sailing vessels continue with monotonous regularity. Coastal boats ply to and fro without any break in their schedules, and marine engineers appear to be perfectly satisfied with the new arrangements made with owners. Several projects are on foot for the development of ocean steam services, and the encouragement of greater inter-empire trade. Whether they will materialize is another matter, but such as they are, their subject should be of more than passing interest to readers of Canadian shipping, and should anything come of them, they may make the material for a subsequent article.

JUDGMENT IN ORTHIA MISHAP

Dominion Wreck Commissioner Capt. L. A. Demers, on Friday last rendered his decision at Montreal, instead of Quebec where the inquiry was held, in connection with the collision on the 4th of July between the freight steamers Airedale and Orthia off White Island, in the Lower St. Lawrence, during a fog.

Both master and pilot of the Donaldson Line steamer Orthia were severely reprimanded in the judgment rendered and the master and pilot of the steamer Airedale fully exonerated.

The following is the full text of the judgment:

"The court having carefully weighed the evidence adduced, finds for the reasons given in the analysis of the testimony of both parties that the Orthia is alone to blame for the collision.

"In view of the conditions of weather and tide, as well as locality, the court will not deal with the certificate of the master or license of the pilot, but reprimands both most severely, especially for the failure to observe Articles 16 and 19, and cautions them against surmising what the other ship is doing when not in sight, or what she will do when seen. The duty of masters, officers and pilots is to exerci proper judgment, 'extraordinary judgment and skill is not demanded,' and to have constantly in mind that the rules of the road have been framed with a view to their observance.

"The court exonerates the Airedale's master and pilot from any blame for this casualty.

"The Airedale offered and rendered the assistance expected by law, meeting the provisions of section 920, Cap. 113, R.C.S., 1906. The Canada Shipping Act."

This judgment was concurred in by Capt. J. Blanchard Henry and Capt. W. H. Miller, acting as assessors.

Evidence Analyzed

Reviewing the evidence heard, Captain Demers said in respect of the Airedale that her speed at the time of the collision had been reduced owing to the dense fog, from slow to dead, seven minutes before the impact, and her speed over the ground could not have been more than one knot, which under the circumstances was permissible. On the appearance of the great light of the Orthia, the engines were put full speed astern and the requisite three blass were given. With regard to the tearing and bending of her stem in two different ways, this could have been produced by the contact with a beam at the first of the impact. The tearing of the lower part and bending to starboard was due to, and caused by, the speed of the Orthia. As to divergence in evidence of the sounding of three blasts, the court accepted in preference the testimony of the Airedale. "The clear, straight-forward evidence of the master and pilot and their attitude in giving same," commented the court, "as well as under cross-examination, is convincing that the Airedale was going at a speed, and sounded the necessary signals which meet in every respect the spirit of the rules of the road and the articles cited."

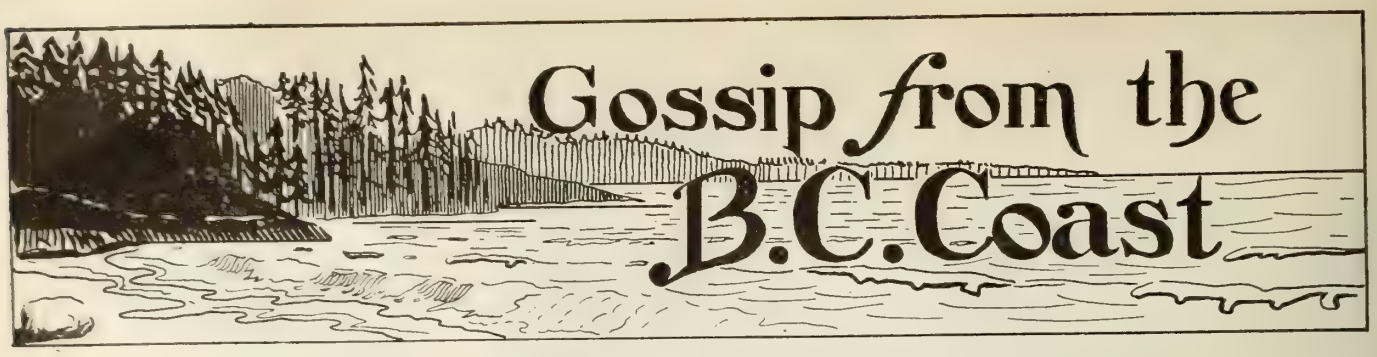
With regard to the steamer Orthia, the judgment stated in part: "Whether the Orthia heard the sound of the Airedale on the port or starboard bow, of which no mention is made in the log, it was her duty to reduce her speed. The court considers that a speed of five and a half knots over the ground, including the tide which was with her, was too great in a fog so dense. The pilot avers that he thought the vessel which proved to be the Airedale was bound to the Saguenay. It is not permissible to presume or surmise. There was a doubt. The directions as found in both paragraphs of Art. 16 should have been followed. The Orthia failed in obeying Art. 19. She had in the first instance the Airedale on her starboard side. It was her duty to take such precautions as to ensure her safety as well as that of the oncoming vessel.

Allowance Made

"With respect to the starboarding order," continued the judgment, "also the reply of the Airedale's three blasts by two blasts, the court feels that for the reason already given (that the Orthia had the wind behind her), the Orthia is excusable under the circumstances, and since the Orthia did not alter her course under that order, which was immediately followed by a hard to port, the signals did not contribute to the collision. Hence a violation of Art. 28 will not be brough against her. Viewing the contradictory evidence from every angle, the court is of opinion that the Orthia fail ed to observe the letter and spirit of Articles 19, 27, and 29."

HARBOUR RESEARCH

Six years ago the Institution of Civil Engineers in Great Britain formed a Committee to study the reasons why timber and other materials used in harbour construction deteriorated. In spite of the interruptions caused by the war, this committee managed to compile a most valuable report which was published about two years ago, and it ha now produced a second report in which subsequent experiments of a most valuable kind are described. The chief subject discussed in this second report is the protection of timber against attack by the teredo and other boring animals. As part of this research, careful investigation was made at a British marine station into the life history and habits of various marine borers. As a result, several promising methods of safeguarding timber are described. Up-to-date information is also given on the resisting powers of concrete exposed to the action of the sea. The investigations of the committees are being continued, and are likely to prove of increasing value to harbour authorities in all parts of the world.



ALTHOUGH the trans-Pacific freight situation is fairly steady lately, with the largest operators showing a tendency to work together, interest in the rate war has shifted to the Panama Canal route, where the Luckenback Line, the United American Lines and several other big concerns have entered competition. The Luckenbacks recently cut the rate on canned goods from 4 to 3 cents; dried peas and beans in cases to 30 cents; dried fruits in cases to 35 cents, and in bags to 40 cents. Officials of the company state that the reductions were necessitated to protect the company against competitors who have been assembling part cartage charges on freight from ships. So far, the Panama Canal rate conflict has not materially affected British Columbia ports.

* * * *

Representations are to be made by the Victoria chamber of commerce to the Canadian National system to take over the wharves of R. P. Rithet & Company. Rithet built the wharves about forty years ago and they have been enlarged and in constant use ever since. It is maintained that with the Canadian National system operating the new docks at Ogden Point, the Rithet wharves will be unable to offer successful competition and should be consolidated with the C. N. R. piers and placed under joint management. This proposal has given considerable impetus to Victoria's agitation for a port commission to handle ocean shipping affairs and for creation of a free port area.

* * * *

Consolidation of the various pilotage authorities has been virtually agreed upon and organization of a committee representative of the various associations now in existence is being planned with a view to obtaining more centralized control. The new system will be under the sole control of a committee of seven, composed of one appointee each of the Vancouver, Victoria and Nanaimo Boards of Trade or Chambers of Commerce (this appointee to be an owner, manager or agent of an ocean steam ship line), three pilots, of which one shall be from the Vancouver Pilots, Ltd., and two from the B. C. Pilotage Association, the seventh member of this committee to be the president of the guild. The committee shall be known as the pilotage management board and will select a chairman from amongst themselves. The Vancouver Board of Trade and the Victoria Chamber of Commerce have already expressed approval of this plan.

* * * *

The Vancouver Harbor Commission has resigned and been replaced by a new board under R. E. Beattie, formerly o Cranbrook. The change in the administration of the board is said to be the result of the Government's desire to have management of Vancouver's port affairs in the hands of men sympathetic with the policy of the present Ottawa administration. The former board was appointed by the Conservative Government.

* * * *

So successful has the ferry service between Sidney, Vancouver Island, and Anacortes, Wash., been that a new company is being formed to operate this route on a larger basis. The new company will probably be supported by Seattle, Victoria, and Everett capital, and plans have been drafted for a new ferry vessel capable of carrying about fifty automobiles. The principal traffic of the two steamers now being operated between Sidney and Anacortas, namely the Gleaner and the Harvester King, consists of automobile tourists and special accommodation for this business will be provided in the new vessel, which will be 140 feet long, with 33-foot beam and engine capable of developing 825 horse power. The engine will probably be of the Diesel type and negotiations are now in progress between the company and the United States Shipping Board for machinery.

* * * *

Hon. Charles Stewart, Canadian minister of immigration, acting in response to representations from the Canadian Pacific Railway, has notified Pacific coast officials of the Canadian Department of Immigration that they must handle passenger traffic at the ports of Victoria and Vancouver with the utmost dispatch so that the Canadian Pacific's steamships may be able to maintain their sailing schedules without delays.

* * * *

It begins to appear as though the tenders filed for the wooden hulls of the Victoria Shipowners, Ltd., now lying in the stocks of the Cholberg Shipyards, Victoria, have not been acceptable to the Federal Government, because more than a month has passed since the bids reached the Ottawa authorities and no announcement has been made as to their disposal. It is pretty well known that all the tenders were extremely low and it is probable that the Government officials have decided that some other more profitable method of getting rid of the hulls and materials must be adopted. The fact that most of the material, other than the lumber and heavy timbers, originated in the United States is a factor that has scared off Canadian bidders to some extent. If the material had been used in ship construction, the custom duties would have been nominal, but if the material is used for other purposes duties must be paid amounting to about $8,000 unless the buyer happens to be in the United States and makes use of the material in that country.

* * * *

John W. Dryer and Ernest E. Bragg, of Victoria, have purchased the towboat Nosradna from Vancouver owners and intend to engage in general towboat operations off the west coast of Vancouver Island, and in waters adjacent to Victoria. The Nosradna, which is one of the most powerful vessels of its type in this vicinity, was built two years ago by Chappel Brothers, of Vancouver.

* * * *

The Admiral Line has mapped out a new schedule of sailings in its Pacific coast service, resulting in the elimination of the Victoria call both northbound and southbound by the steamer H. F. Alexander, formerly the Great Northern, but giving Victoria a twice-a-week service instead of weekly, as heretofore, by placing the steamers Admiral Dewey, Admiral Schley, Dorothy Alexander and Ruth Alexander on the Victoria run. The Dewey and Schley will not go further south than San Francisco, while the other boats will include Wilmington.

* * * *

If negotiations now pending materialize, the H. F. Alexander, now the fastest ship operating under the American flag, will be diverted from the coastwise route to the Hawaiian service this winter. The Alexander could make the Hawaiian run in four days and one hour from San Francisco. If she is diverted to that service, she will probably be operated jointly by the Admiral Line and the Watson Navigation Company, although if the winter travel between British Columbia, Puget Sound and California holds up well no change in the present schedule will be made.

The Admiral Line Steamship, H. F. Alexander, fastest vessel under the United States flag, now plying in the California-Puget Sound service, ran aground on Cake Rock August 11 and will be out of commission for about three weeks.

* * * *

The steamship Sandon Hall, owned by the Ellerman interests, inaugurated a new service from the United Kingdom when she arrived recently in British Columbia ports from South Africa and loaded a cargo of lumber and general merchandise for the British Isles. The Ellermans plan a regular monthly service and, if conditions warrant, ships will be operated on a fortnightly basis.

* * * *

The Empress of Australia, formerly the German ship Tirpitz, said to be the pet of Herr Baillin, the German shipping giant, has made her first sailing in the trans-Pacific route. With the Empress of Canada, Empress of Russia and Empress of Asia she rounds out the best service that the Canadian Pacific has ever provided for this ocean.

* * * *

A. Melville Dollar, managing director of the Canadian Robert Dollar Company, with headquarters for years in Vancouver, has resigned from that position and also from the vice-presidency of the Pacific Steamship Company, operators of the Admiral Line. Kenneth J. Burns, manager of the company at Vancouver for several years, will succeed Mr. Dollar. Mr. Dollar will continue active in shipping affairs, although retiring from nominal charge of the Dollar Company's business.

* * * *

George M. Massey has been in British Columbia looking over the possibilities of establishing a service between this province and Manchester, England. Mr. Massey represents the Manchester Ship Canal and he has been negotiating with Messrs. B. W. Greer, Vancouver, as agents for the proposed new service. The new operations would make it possible for Pacific Coast shippers to quote the same prices c.i.f. Manchester, as c.i.f. Liverpool.

* * * *

The cleaning plant operated in connection with Vancouver's grain elevators will be enlarged at a cost of $80,000, and D. V. Whitehead, of the firm of Barnett & McQueen, Fort William, is in charge of the erection of the machinery.

* * * *

The Empress of Japan, operated for thirty years in the trans-Pacific service by the Canadian Pacific, is now tied up at Vancouver and will probably be sold in the near future. She has covered during her period of service about 2,500,000 miles and has made the voyage to the Orient 158 times. For many years the steampship held the record for trans-Pacific steaming, her time being ten days and ten hours.

The naval training station at Esquimalt will be re-opened this fall and three destroyers will be quartered on the Pacific Coast, according to Hon. George P. Graham. The Royal Naval College, which has been operated at Esquimalt since the Halifax disaster, has been closed and will not be re-opened owing to lack of adequate Government appropriations.

* * * *

A new ten-day service between the north Pacific coast and the Gulf of Mexico was inaugurated August 1 with the sailing of one of the Steel Steamship Line's vessels from New Orleans and Mobile. The company has acquired seven vessels to maintain in this service, the Eurrana, Chincha, Santa Cecilia, Centurus, Circinus and Corvlis the smallest of which is of 9,600 tons. All these vessels will be used in the new service. The Steele Line, according to President B. M. Flippin, are members of the Gulf Conference, which controls rates from the Gulf to Pacific Coast ports, and there is no intention to disturb present freight arrangements. Two years ago the company operated its first service to this coast, including at that time the ports of Portland, Seattle, Los Angeles, and San Francisco; with the seven vessels in service the company will now be able to embrace other ports in the sailing schedules. It is expected that the Steele Line will be an important factor in the development of British Columbia's lumber business to the Gulf States, as high railroad rates have been a deterrent to that business in the past.

NAVIES BUILT AND BUILDING

Statistics of the Leading Powers

An Admiralty return, dealing with the navies of the principal countries, just issued, shows that little building is going on at the present time. The appended tables give the numbers of vessels (built and building) composing the fleets of the British Empire, the United States, Japan, France, Italy, Russia and Germany on February 1st, 1922, obsolete ships being omitted. In the case Russia it is stated that many of the warships whose names appear in the lists are of no military value at present and that construction has been suspended on most of the vessels in course of building. The ships to be scrapped under the Washington Treaty are also included in the return.

BUILDING

	Brit. Emp.	U. States	Japan	France	Italy	Russia	Germany
Battleships	0	9	2	0	0	1	0
Battle cruisers	0	6	2	0	0	4	0
Cruisers	0	0	0	0	0	0	0
Light cruisers	[illegible]	10	13	3*	0	[illegible]	1*
Monitors, &c.	0	0	0	0	0	0	0
Aircraft carriers	2	3	2	1	0	0	0
Flotilla leaders	2	0	0	6*	3	0	0
Destroyers	6	3	28	1†	7	26	0
Torpedo boats	0	0	0	0	4	0	0
Submarines	8	38	31	12*	4	21	0
Sloops	0	0	0	0	0	0	0
Coastal M. boats	6	2	2	0	0	0	0
Gunboats and despatch vessels	0	1	0	3	6	0	0
River gunboats	0	0	5	2	0	0	0

*Projected †12 Projected.

BUILT

	Brit. Emp.	U. States.	Japan	France	Italy	Russia	Germany
Battleships	22	31	11	10	12	9	8
Battle cruisers	8	0	7	0	0	0	0
Cruisers	3	10	0	7	4	5	0
Light cruisers	51	9	12	5	10	1	3
Monitors, &c.	5	0	5	0	[illegible]	0	0
Aircraft carriers	4	1	1	0	0	0	0
Flotilla leaders	16	0	0	1	[illegible]	0	0
Destroyers	184	315	58	53	58	23	16
Torpedo boats	68	0	0	0	73	0	16
Submarines	93	102	24	50	43	23	0
Sloops	30	0	0	[illegible]	0	1	0
Coastal M. boats	27	0	0	2	0	0	0
Gunboats and despatch vessels	0	4	4	69	1	4	0
River gunboats	17	2	3	3	4	36	0

HOPES FOR ALCOHOL FUEL

From the scientific point of view alcohol is an excellent fuel for motor cars and other machines driven by internal combustion engines. In view of the importance of the subject, Great Britain has organized careful research not only into the uses of alcohol of different strengths and in different types of engines, but into the possibility of finding some source of alcohol which will be cheap and abundant. This research is being assisted by a Government grant, and it has already produced some highly interesting results. The efficiency of fuel alcohol is in fact higher than that of either petrol or Benzol. A new series of experiments is now in hand with a view to investigating the influence of ether on alcohol and also the influence of alcohol mixed with petrol, benzol, paraffin and other familiar oils. In connection with the fuel question it is interesting to note that discoveries of oil deposits have rewarded the patient investigation which has been carried out for some time in Great Britain. In one part of Scotland oil has been met with at a depth of over 1,800 feet, and the oil is stated to be of excellent quality with a high percentage of petrol, kerosene and lubricating oil.

THE ROTASCOPE

The National Physical Laboratory, which was established near London by the British Government, has produced quite a number of scientific instruments of the highest value. One of those was recently shown at a scientific exhibition in London. Its purpose is to render a rotating object continuously visible while it appears to be at rest. The method adopted is different from that of illuminating the object by a series of brief flashes of light. The principle made use of is a property of reflection from a smooth surface which is rotated round an axis parallel to the surface and in line with the axis of the object. When this reflecting surface is rotated at half the speed of the object itself, the image in the reflecting surface appears stationary.

LLOYD'S REGISTER SHIPBUILDING RETURNS

For the Quarter ended June, 1922

WE PUBLISH to-day Lloyd's Register shipbuilding returns for the quarter ended June 30. The merchant tonnage returned as under construction in the United Kingdom at the end of June amounts to 1,919,504 tons. This represents a reduction of about 316,000 tons as compared with the total at the end of the previous quarter; but under the present conditions even these reduced figures cannot be regarded as a true index of the activity of the shipbuilding industry in the near future.

The total includes a considerable amount of tonnage (481,000 tons) on which work has been suspended for some time. Deducting this amount in order to enable a comparison to be made with the figures for normal times, the tonnage actually under construction in the United Kingdom now amounts to 1,439,000 tons. The average tonnage under construction during the twelve months immediately preceding the war was 1,800,000 tons, i.e., 451,000 tons more than the present figures.

As compared with the figures for the quarter ended March 31, there has been a considerable reduction in the tonnage launched and in the tonnage commenced in the United Kingdom during the past quarter, the tonnage of vessels launched being 185,000 tons and of those commenced 12,000 tons less. The total merchant tonnage building abroad is 1,315,926 tons, but this includes about 290,000 tons upon which work has been suspended, leaving about 1,026,000 tons actually under construction. It will be seen that the tonnage building abroad is about 128,000 tons lower than the total building at the end of March. The decrease affects most countries, but specially France, Holland and Italy. The figures for the leading countries abroad are: Italy, 285,671 tons; France, 243,290 tons; Holland, 226,318 tons; United States, 150,623 tons, and Japan, 115,512 tons.

The above figures do not take into account the tonnage building in Germany and Danzig, for which no returns are available, but it is estimated that the tonnage under construction in Germany at the present time is about 500,000 tons, and at Danzig 45,000 tons, as compared with a total of 547,000 tons in June, 1914.

From the table showing the number and tonnage of vessels launched in the world during the quarter under review, it will be seen that the total figures amount to 389,760 tons, of which 148,886 tons were launched in the United Kingdom and 240,874 tons abroad. In addition to the above, about 150,000 tons were launched in Germany, but, as previously stated, these figures are only approximate and are, therefore, not included in the tables. The tonnage commenced during the same period amounted to 150,822 tons, of which only 38,877 tons were commenced in the United Kingdom.

The returns show that there are at the present time 82 steamers and motor vessels, each of over 1,000 tons, with a total tonnage of 529,911 tons, under construction in the world for the carriage of oil in bulk. Of the total, 60, of 383,221 tons, are under construction in the United Kingdom. The tonnage of vessels now building which are to be fitted with internal combustion engines amounts to 251,328 tons.

Of the total tonnage given as being under construction in the world—which total excludes vessels the construction of which has not actually been commenced and also all vessels of less that 100 tons—2,010,912 tons are under the inspection of the Society's Supervisors, with a view to classification in Lloyd's Register Book.

MERCHANT VESSELS UNDER CONSTRUCTION

The Returns compiled by Lloyd's Register of Shipping, which takes into account only vessels of 100 tons gross and upwards the construction of which has actually been commenced, show that there were **390 merchant vessels of 1,919,504 tons gross** under construction in the **United Kingdom** at the close of the quarter ended June 30, 1922. The particulars of the vessels in question are as follows, similar details being given for the preceding quarter for the purpose of comparison:—

	No	Gross Tons	No.	Gross Tons
Steam				
Steel	347	1,787,158	394	2,097,595
Ferro-Concrete	...	.....	...	.....
Wood and Composite	2	1,202	3	1,912
Total	349	1,788,360	397	2,099,507
Motor				
Steel	9	2,010	11	2,500
Ferro-Concrete	...	.....	..	.....
Wood and Composite	2	345	1	205
Total	32	129,134	29	133,991
Sail				
Steel	5	4...4	11	2,500
Ferro-Concrete	...		..	.....
Wood and Composite	...	.....	..	.....
Total	9	2,010	11	2,500
Total Steam, Motor and Sail	390	1,919,504	437	2,235,998

The tonnage now under construction in the United Kingdom is about 316,000 tons less than that which was in hand at the end of last quarter and about 1,611,000 tons less than the tonnage building 12 months ago.

These figures, however, do not represent the work actually in progress. The total now returned as under construction includes 481,000 tons on which work has been suspended, the work actually in hand being thus reduced to 1,439,000 tons.

Of the vessels being built in the United Kingdom at the end of June, as recorded in the above Table, 315 or 1,470,977 tons are under the inspection of the Surveyors of Lloyd's Register with a view to classification by this Society.

WORK IN HAND IN PRINCIPAL DISTRICTS

The following table gives the total figures for vessels now under construction in the principal shipbuilding districts of the country, as compared with those for the previous quarter. Each district of course includes places in the neighborhood of the port after which it is named.

District		June 30 No.	June 30 Gross Tonnage	Mar. 31, 1922 No.	Mar. 31, 1922 Gross Tonnage
Aberdeen	*	5	5,845	4	4,495
	†	1	140	..	.....
Total		6	5,985	4	4,495
Barrow, Maryport and Workington	*	5	35,450	5	48,870
	†	1	6,998	1	6,998
Total		6	42,448	6	55,868
Belfast	*	25	274,110	29	305,610
	†	..	.....	..	.....
	‡	..	.....	..	.....
Total		25	274,110	29	305,610
Bristol	*	4	2,000	4	2,000
	†	3	7,408	3	7,800
Total		7	9,408	7	9,800
Clyde—Glasgow	*	72	459,821	91	534,852
	†	9	57,832	11	67,350
	‡	..	.....	1	500
Total		81	517,653	103	602,702
Greenock	*	22	138,393	25	161,656
	†	3	24,300	3	24,300
	‡	.	.....	.	.....
Total		25	162,693	28	185,956
Dublin	*	2	1,045	1	880
Dundee	*	8	41,550	13	48,650
	†	1	7,770	1	7,770
Total		9	49,250	14	56,350
Hartlepool	*	10	46,530	12	56,680
Hull	*	13	33,367	13	34,367
	†	4	757	2	357
Total		17	34,124	15	34,724
Leith	*	6	20,070	5	18,470
	‡	1	250	..	...
Total		7	20,320	5	18,470
Liverpool	*	18	62,120	22	89,950
	†	.	.....	.	.....
Total		18	62,120	22	89,950
Londonderry	*	.	.....	2	6,700
Middlesbro' Stockton and Whitby	*	13	67,194	17	91,707
	†	2	8,000	2	8,000
	‡	..	.....	1	280
Total		15	75,124	20	99,987
Newcastle	*	64	374,604	69	432,305
	†	2	9,700	2	5,849
	‡	.	.....	.	.....
Total		66	384,304	71	438,154
Newport, Mon.	*	5	10,046	5	10,046
	‡	.	.....	.	.....
Total		5	10,046	5	10,046

Southampton	*	19	44,007	18	43,917
	†	3	879	2	759
	‡	1	600	1	600
Total		23	45,486	21	45,276
Sunderland	*	25	138,591	32	176,287
	†	1	5,170	1	5,170
	‡	2	540	.	.....
Total		28	144,301	33	181,457

*Steam †Motor ‡Sail

MERCHANT VESSELS UNDER CONSTRUCTION IN THE WORLD

Where Building		No.	Gross
United Kingdom	*	349	1,788,360
	†	32	129,134
	‡	9	2,010
Other Countries	*	343	1,165,525
	†	71	122,194
	‡	57	28,207
Total for the World	*	697	2,953,885
	†	103	251,328
	‡	66	30,217

*Steam †Motor ‡Sail

The tonnage now under construction in Germany and Danzig is estimated to be about 500,000 tons and 45,000 tons respectively. If these figures be added to the totals shown in the above Table, the grand total building in the world would appear to be about 3,780,000 tons.

The three tables which follow give further details of the work in United Kingdom and foreign yards. The fourth gives details of vessels commenced and launched during the quarter, and the last is an analysis of the size of steamers and motor vessels under construction abroad. It is of interest to note that at the end of June there were under construction abroad 22 steamers and motor vessels of 1,000 tons and above with a total tonnage of 146,690, intended to carry oil in bulk. Of these, six, of 60,880 tons, were building in the United States, six, of 35,693 tons, in Italy, and five, of 32,200 tons, in France.

NATIONALITY OF VESSELS

Country for which Intended.	No.	Gross Tons
United Kingdom	286	1,437,966
Argentine	4	4,850
Brazil	...	.....
British Dominions	11	37,756
Belgium	4	11,260
Chili	2	14,000
Denmark	1	4,850
France	15	88,660
Greece	2	8,850
Holland	12	135,041
Italy	1	18,017
Japan	3	17,600
Norway	3	6,625
Poland	1	1,200
Roumania	3	2,460
Spain	1	4,400
Sweden	1	5,170
United States	...	.....
For Sale or Flag not stated	40	120,799
Total	390	1,919,504

VESSELS COMMENCED AND VESSELS LAUNCHED DURING THE QUARTER

Countries	Commenced Steam No.	Steam Tons Gr.	Motor No.	Motor Tons Gr.	Sail No.	Sail Tons Gr.	Total No.	Total Tons Gr.	Launched Steam No.	Steam Tons Gr.	Motor No.	Motor Tons Gr.	Sail No.	Sail Tons Gr.	Total No.	Total Tons Gr.
U. K.	12	37,177	5	810	4	890	21	38,877	33	139,312	3	9,294	1	280	37	148,886
Dominions	1	.....	.	...	.	...	..	.....	1	1,780	.	.....	.	...	1	1,708
Belgium	.	2,250	1	253	.	...	..	.....	6	17,165	.	.....	3	1,435	9	18,600
China	1	700	.	...	1	350	2	1,050	5	6,002	.	.....	.	...	5	6,002
Denmark	1	1,050	1	2,925	.	...	1	3,975	5	8,765	1	7,100	.	...	6	15,865
Esthonia	.	.....	.	...	1	600	1	600	3	1,147	.	.....	5	1,390	8	2,537
France	11	23,360	.	...	.	...	11	23,360	13	59,069	.	.....	.	...	13	59,069
Holland	3	12,100	1	5,250	.	...	4	17,350	17	49,313	.	.....	.	...	17	49,313
Italy	2	200	.	...	.	...	2	200	5	19,474	1	2,000	5	1,368	11	22,842
Japan	3	13,990	.	...	.	...	3	13,990	6	15,840	.	.....	.	...	6	15,840
Norway	3	3,389	.	...	.	...	3	3,389	4	6,000	.	.....	.	...	4	6,000
Spain	.	.....	.	...	.	...	..	.....	1	2,300	.	.....	.	...	1	2,300
Sweden	.	.....	1	130	.	...	1	130	..	.....	2	7,975	1	375	3	8,350
U.S.A.	8	39,200	2	1,498	6	4,700	16	45,398	7	30,292	2	700	4	1,384	13	32,376
Total	45	133,416	11	10,866	12	6,540	68	150,822	106	356,459	9	27,069	19	6,232	134	389,760

In addition to the above it is estimated that about 150,000 tons were launched in Germany during the quarter, making a World total of about 540,000 tons.

MERCHANT VESSELS UNDER CONSTRUCTION ABROAD

Countries	Steamers and Motor Vessels: Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Sailing Vessels: Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Total No.	Total Gross Tons
America—										
United States—										
Atlantic Coast	19	108,135	1	800	4	3,700	3	4,800		
Gulf Ports	..	.....	..	....	.	.....	.	.....	36	150,623
Pacific Coast	5	18,100	1	1,138	..	.....	.	.....		
Great Lakes	3	13,950	..	.....	..	.....	..	.....		
British Dominions—										
Australia	6	21,447	..	...	..	.....	..	.....		.....
Canada—										
Great Lakes	1	2,000	.	...	..	.....	..	.....		
Coast	6	7,750	.	...	.	.....	.	.....	24	49,960
Hong Kong	3	9,910	.	...	.	.....	.	.....		
Others	2	2,500	1	253	.	.....	.	.....		
Belgium	7	17,313	.	...	.	.....	.	.....	7	17,313
Brazil	1	2,170	.	...	.	.....	.	.....	1	2,170
China	6	6,702	.	...	1	350	.	.....	7	7,052
Denmark	22	51,199	1	450	.	.....	.	.....	23	51,649
Esthonia	3	1,701	5	1,090	.	.....	11	3,870	19	6,661
Fiume District	6	6,499	2	340	.	.....	.	.....	8	6,839
France	52	242,690	.	...	1	600	.	.....	53	243,290
Greece	.	.....	1	600	.	.....	.	.....	1	600
Holland	99	226,318	.	...	.	.....	.	.....	99	226,318
Italy	53	273,526	20	8,118	.	...	15	4,027	88	285,671
Japan	26	115,512	.	...	.	.....	.	.....	26	115,512
Norway	33	52,928	.	...	2	475	.	.....	35	53,403
Portugal	.	.....	5	2,943	.	.....	9	3,040	14	5,983
Spain	11	52,257	.	...	.	.....	1	150	12	52,407
Sweden	16	38,700	2	680	.	.....	5	1,095	23	40,475
Total	380	1,271,307	39	16,412	8	5,125	49	23,082	476	1,315,926

The total tonnage building abroad includes 290,000 tons upon which work is now suspended the country mostly affected being Italy.

SIZE OF VESSELS UNDER CONSTRUCTION

The following table shows the vessels under construction in the United Kingdom classified according to gross tonnage:——

Gross Tonnage	Number Steam	Motor	Sail
100 and under 500	43	9	8
500 and under 1,000	43	1	1
1,000 and under 2,000	40	1	—
2,000 and under 3,000	14	3	—
3,000 and under 4,000	16	—	—
4,000 and under 5,000	21	3	—
5,000 and under 6,000	41	3	—
6,000 and under 8,000	64	9	—
8,000 and under 10,000	30	3	—
10,000 and under 12,000	4	..	—
12,000 and under 15,000	13	—	—
15,000 and under 20,000	15	—	—
20,000 and under 25,000	4	—	—
25,000 and under 30,000	1	—	—
30,000 and under 40,000	—	—	—
40,000 tons and above	—	—	—
Total	349	32	9

SIZE OF STEAMERS AND MOTOR VESSELS UNDER CONSTRUCTION

Country Where Building	A	B	C	D	E	F	G	H	Totl
Belgium	6	..	..	..	1	..	..	..	7
Dominions	12	5	..	1	..	1	..	..	19
Denmark	13	7	1	2	..	..	..	..	23
France	10	15	10	12	1	4	..	..	52
Holland	63	16	5	9	5	1	..	..	99
Italy	31	6	16	18	..	..	..	2	73
Japan	5	8	4	7	1	1	..	..	26
Norway	29	2	2	..	..	..	..	..	33
Spain	3	4	..	2	..	2	..	..	11
Sweden	10	4	4	..	..	..	..	..	18
U. S. A.	12	5	2	3	2	3	2	..	29
Others	27	2	..	..	..	..	..	..	29
Total	221	74	44	54	10	12	2	2	419

A—Under 2,000 tons. B—2,000 to 3,999. C—4,000 to 5,999. D—6,000 to 7,999. E—8,000 to 9,999. F—10,000 to 14,999. G—15,000 to 19,999. H—20,000 tons and over.

C G. M. M. APPOINTMENTS

P. C. Bennett, to be Chief Engineer of S. S. "Canadian Ranger."

W. Fotheringham to be Chief Engineer of S. S. "Canadian Hunter."

J. H. Cumming to be Chief Engineer of S. S. "Canadian Warrior."

S. Gruzelier to be Chief Engineer of S. S. "Canadian Signaller."

J. S. Cann to be Chief Engineer of S. S. "Canadian Gunner."

R. G. R. Fairweather to be Chief Engineer of S. S. "Canadian Beaver."

Sarnia:—In order to improve the St. Clair River the U. S. Government has allotted $800,000 to be spent in 1923. This is from the appropriations for river and harbor improvements made by Congress last year.

Buffalo:—The strike of the Buffalo longshoremen which has been on for three months, for an increase of ten cents an hour in pay, has been called off by the International Union.

Brockville:—The steamer "Senator Derbyshire" has been released after being at Goose Neck Point, and is now at the Ogdensburg shipyard undergoing repairs. She had a cargo of pulpwood from Ha Ha Bay, and belonged to the George Hall Coal Co.

A Survey of World Shipping

Lloyd's Register Statistics

THE NEW edition of Lloyd's Register Book contains as usual very complete particulars of all the sea-going vessels of the world of 100 tons and upwards, and, in addition of the steel and iron vessels trading on the Great Lakes of North America. It thus includes a full record of upwards of 35,000 steamers, motor vessels and sailing vessels. These bulky volumes comprise also many lists of great practical value to the shipping community, such as: Signal letters assigned to all sea-going vessels; shipbuilders and marine engineers in all countries; telegraphic and postal addresses of firms connected with shipping in all parts of the world; particulars of dry and wet docks, ports, harbours, etc., at home and abroad; particulars of speeds of merchant steamers capable of 12 knots; particulars of deadweight and cubic capacities of cargo steamers and motor vessels; lists of bulk oil carriers; lists of shipowners and managers, with the names and tonnages of their respective vessels, etc. As is well-known, the information contained in the Register Book is indispensable for carrying on any branch of shipping business.

The section of the book which is perhaps of the greatest interest to the general public is that containing the Statistical Tables. In dealing with these tables it is important to draw special attention to the notice at the commencement of the Section, which defines with precision the basis on which the figures have been compiled. The contents of the tables will repay careful study, and attention may be drawn to Table No. 5, which shows that more than twenty-eight and three-quarter million tons of shipping are classed by Lloyd's Register. Table No. 1 is of interest and importance as giving the total tonnage owned in the several countries of the world. This table shows that there are recorded in the Register Book (excluding vessels of less than 100 tons), 4680 sailing vessels of 3,027,834 tons, and 29,255 steamers and motor vessels of 61,342,952 tons, making a world total of 33,935 vessels of 64,370,786 tons gross. The following summary of some of the results which are to be obtained by an analysis of these tables, and by a comparison of it with the similar tables issued by Lloyd's Register in previous years, will be found of interest.

The reduction in sailing tonnage since pre-war time—say June 1914—amounts to 952,000 tons, a much smaller decrease than occurred in the previous period of eight years. This result is principally due to the increase which has taken place in the United States, the only country that has added to its sailing tonnage since 1914, apart from any ex-German tonnage allocated. Over 41 per cent. of the world's sailing tonnage is now owned in the United States. It should, however, be remembered that the figures for that country include a large proportion of sailing barges.

The other countries which still have a considerable amount of sailing tonnage are: France (308,000 tons), the United Kingdom (207,000 tons), Norway (183,000 tons) and Italy (168,000 tons). The percentage of sailing vessels to the world's tonnage is now 4.7 per cent. as compared with 8 per cent. in 1914, and nearly 22 per cent. in 1902, and in view of this small percentage it will no doubt be more convenient if sailing vessels be excluded from consideration in dealing with the present relative position of the various countries.

Steamers and Motor Vessels

The tonnage of wood vessels owned in 1914 amounted to 1 per cent. of the total steam tonnage whereas for the present year that percentage has risen to 3.6 per cent. This is, of course, one of the effects of the shortage of tonnage during the war, which resulted in the construction of a large number of wood vessels. Whereas in 1914 the wood sea-going steam tonnage owned in the United States amounted to 210,000 tons, the corresponding figure is now no less than 1,147,000 tons. Wood vessels, however, are not of great importance in international trade, and for the purposes of comparison it would perhaps be more accurate if they were excluded. For this reason in the following figures, which show the steam and motor tonnage owned by the principal maritime countries, now and eight years ago, only steel and iron sea-going vessels are included (three 000's omitted).

Country	June 1914	June 1922	Difference between 1922 & 1914
	Tons gross	Tons gross	Tons gross
United Kingdom	18,877	19,053	+ 176
British Dominions	1,497	2,201	+ 794
America (U.S.)	1,837	12,503	+10,669
Austria-Hungary	1,052	Nil	
Denmark	768	944	+ 176
France	1,918	3,303	+ 1,385
Germany	5,098	1,783	— 3,315
Greece	820	653	— 167
Holland	1,471	2,613	+ 1,142
Italy	1,428	2,600	+ 1,172
Japan	1,642	3,325	+ 1,683
Norway	1,923	2,237	+ 414
Spain	883	1,187	+ 304
Sweden	992	996	+ 4
Other countries	2,398	3,301	+ 903
Total abroad	23,637	37,749	+14,112
World's total	42,514	56,802	+14,288

It will be seen that among the principal countries, apart from Germany, Greece is the only one which still shows a reduction in tonnage now owned as compared with 1914. Notwithstanding the increased construction and the large amount of ex-enemy tonnage allocated to British ownership, and, of course, included in the figures, there are at the present time only 176,000 tons more owned in the United Kingdom than in 1914.

The sea-going tonnage of the United States has increased by over 10 2-3rd million tons. The other countries in which the largest increases are recorded are:—Japan (1,683,000 tons); France (1,385,000 tons); Italy (1,172,000 tons); and Holland (1,142,000 tons). As in the case of the United Kingdom, the figures for France and Italy include a considerable amount of ex-enemy tonnage allocated to these countries. The figures for Germany conclusively show the change in the maritime position of that country. While in 1914 Germany ranked next to the United Kingdom with over 5,000,000 tons of sea-going steel and iron steamers, such tonnage now stands at only 1,783,000 tons. The United States percentage of the world's sea-going steel and iron steam tonnage has increased from 4.3 in 1914 to 22 in 1922.

The relative position of some other countries has also altered to a large extent. In 1914 the United Kingdom owned nearly 44 per cent. of the world's sea-going steam tonnage, the present percentage is just over 33½. Norway, which occupied the third place, is now seventh, while Japan, which was sixth, is now third, closely followed by France with only 22,000 tons less. Taken together, the Scandinavian countries—Norway, Sweden and Denmark—show an increase as compared with 1914, of 594,000 tons.

Summarizing the totals it will be seen that the present position of the sea-going merchant steel and iron steam tonnage, as compared with 1914, is as follows (three 000's omitted):—

Increase in the United Kingdom	176
Increase in the United States	10,669
Increase in other countries	7,810
	18,655
Loss to Germany	3,315
Ex-Austro-Hungarian tonnage	1,052
	4,367
Net world's increase since 1914	14,288

A comparison between the figures issued in the 1922-23 and the 1921-22 edition of Lloyd's Register Book shows that the world's total steam and motor tonnage recorded in the present edition exceeds by 2½ million tons the figures for the previous year.

The countries where the largest increases have taken place during the twelve months are as follows:—Germany 1,131,000 tons, Holland 409,000 tons, British Dominions 258,000 tons, France 239,000 tons, Japan 232,000 tons, Italy 231,000 tons.

The increase in the tonnage recorded as German in the new edition of the Register Book as compared with the 1921 edition is due partly to new vessels built in the years 1920-22 and now registered as German, and partly to the transfer to German flag of ex-German vessels which had been allocated or sold to other countries. On the other hand the figures for the United Kingdom actually show a decrease for the year of 231,000 tons, owing, no doubt, to the large amount of tonnage sold abroad.

Size and Type of Vessels

In 1914 there were 3668 sea-going steamers each of 4,000 tons and above; there are now 5,519. The greatest increase has taken place in those of between 6,000 and 10,000 tons, their num-

ber having increased from 1004 in 1914 to 1926 in 1922.

The following table shows the relative position of the principal maritime countries as regards the number of large vessels and also the progress during the last eight years:—

Flag		4,000 and under 6,000	6,000 and under 10,000	10,000 and under 15,000	15,000 and above	Total
British	1914	1,283	462	111	27	1,883
	1922	1,277	725	137	51	2,190
United States	1914	82	50	10	1	143
	1922	789	615	60	12	1,476
French	1914	1,033	25	12	2	169
	1922	190	104	19	3	316
Dutch	1914	62	42	5	3	112
	1922	108	129	7	4	248
Italian	1914	80	27	—	—	107
	1922	191	78	6	4	279
Japanese	1914	61	43	7	—	111
	1922	200	97	11	—	308
Norwegian	1914	58	12	2	—	72
	1922	113	40	2	—	155
Others	1914	703	316	31	21	1,071
	1922	394	138	13	2	547
Grand total	1914	2,432	1,004	178	54	3,668
	1922	3,262	1,926	255	76	5,519

The statistical tables for this year include, among others, a new table showing for the various countries of the world the number of steamers and motor vessels according to certain divisions of gross tonnage and according to certain divisions of age. It will be seen that out of a total of 29,255 vessels o 100 tons and above, 8,522 are less than five years old, 4,165 are of five years and under 10 years, 3,540 are of 10 years an under 15 years, 3,750 are of 15 and under 20 years, 2,899 are of 20 and under 25 years, and 6,379 vessels are of 25 years and over.

A striking point is the large proportion of comparatively new vessels owned in some countries, no doubt due to the large number of vessels built during and after the war; for instance, of the sea-going vessels of the United States, nearly 63 per cent have been built in the last five years. Similar percentages for other countries are:—Japan 40 per cent., France and Holland both 33 1-3 per cent., Germany 31½ per cent., Belgium 31 per cent., and Denmark 30 per cent., whereas the percentage in the United Kingdom is less than 23. Of the 76 largest vessels now owned in the world—those of 15,000 tons and above—33 are under 5 years old, 18 between 5 and 10 years old, and the other 25 between 10 and 25 years old.

A careful analysis made of the vessels entered in the special lists included in Lloyd's Register Book brings forth some very interesting points. Whereas in 1914 there were in existence 385 steamers for the carriage of petroleum in bulk with a total tonnage of 1,479,000 tons, the present book includes 977 steamers and motor vessels of 5,057,000 tons for that trade, an increase of 242 per cent. in the tonnage. If the smaller vessels were excluded, say those of under 2,000 tons, which are mostly used for local trade, the average of the others (823 of 4,915,525 tons) would reach 5,973 tons each. Included in the total are 353 vessels of between 6,000 and 10,000 tons and 43 of over 10,000 tons each.

The number of vessels fitted with internal combustion engines has increased enormously since 1914. At that date 290 such vessels of 234,000 tons were recorded in the Register Book, and now the total figures are 1,639 of 1,511,000 tons, including 149 vessels of over 3,000 tons each with a total tonnage of 848,000 tons.

A great development has also taken place as regards the use of liquid fuel on board steamers. In 1914 there were 364 steamers of 1,310,000 tons fitted for burning oil fuel, whereas the present Register Book includes no less than 2,793 such vessels of 14,383,000 tons, which tonnage is nearly 11 times that of 1914. The following interesting comparison, expressed in percentages of total gross tonnage, between the two years may be noted as regards the division of motive powers:—

	1914 Per cent. of total gross tonnage.	1922 Per cent. of total gross tonnage.
Sail power only	7.95	4.70
Oil, etc., in internal combustion engines	0.47	2.35
Oil fuel for boilers	2.62	22.34
Coal	88.96	70.61
	100.00	100.00

It will thus be seen that only 70.6 per cent. of the tonnage of the Merchant Marine now depends upon coal, while in 1914 the percentage was 89.

Age of World's Shipping

THE FOLLOWING table shows that out of the 29,255 vessels of 100 tons and above classified throughout the world 8,522 are less than five years old, 4,165 are of five years and under ten years, 3,540 are of ten years and under fifteen years, 3,750 are of fifteen and under twenty years, 2,899 are of twenty and under twenty-five years, and 6,379 are of 25 years and over.

Attention may be drawn to the large proportion of comparatively new vessels owned in some countries, no doubt due to the large number of vessels built during and after the war. For instance, of the sea-going vessels of the United States nearly 63 per cent. have been built in the last five years. Similar percentages for other countries are:—Japan 40, France and Holland 33 1-3 per cent., Germany 31½ per cent., Belgium 31 and Denmark 30, whereas the percentage in the United Kingdom is less than 23. It is of interest to find that of the 76 largest vessels now owned in the world—those of 15,000 tons and above—33 are under five years old, 18 between five and ten years old, and the other 25 between ten and twenty-five years old.

Below we give the detailed figures for the principal shipping countries. So far as British shipping is concerned, it will be observed that no fewer than 955 of the ships between 100 and 500 tons are 25 years old or over, and that the numbers remain substantial up to the 4,000-ton line. Over 4,000 tons, however, the British mercantile fleet is comparatively modern, for out of 2,019 of such ships only 575 are 15 years or more old, and of 363 vessels over 8,000 tons no fewer than 269 are less than fifteen years old.

UNITED KINGDOM

Division of Tonnage	Division of Age A	B	C	D	E	F	Total
100 to 500	629	788	484	566	417	955	3839
500 to 1,000	234	82	90	94	78	178	756
1,000 to 2,000	168	120	145	133	79	168	813
2,000 to 4,000	205	129	130	222	155	162	1003
4,000 to 6,000	359	228	210	186	110	58	1151
6,000 to 8,000	198	112	68	41	65	21	505
8,000 to 10,000	70	39	20	32	20	4	185
10,000 to 15,000	40	28	33	9	17	3	130
15,000 to 20,000	21	6	4	3	—	—	34
20,000 & over	3	3	2	5	1	—	14
Total	1927	1535	1186	1291	942	1549	8430

U. S. A. (SEA)

100 to 500	203	56	68	77	85	126	615
500 to 1,000	18	31	34	42	23	50	198
1,000 to 2,000	43	52	16	19	26	45	201
2,000 to 4,000	962	70	50	42	45	108	1277
4,000 to 6,000	607	58	44	29	32	17	787
6,000 to 8,000	432	58	19	11	8	—	528
8,000 to 10,000	65	10	—	4	8	—	87
10,000 to 15,000	36	9	—	2	7	6	60
15,000 to 20,000	2	2	—	2	1	—	7
20,000 & over		2	1	2	—	—	5
Total	2368	348	232	230	235	352	3765

FRANCE

100 to 500	149	79	124	115	71	149	687
500 to 1,000	25	19	20	19	10	42	135
1,000 to 2,000	105	27	22	23	10	66	253
2,000 to 4,000	179	21	29	24	22	57	332
4,000 to 6,000	73	26	25	29	24	13	190
6,000 to 8,000	26	11	4	13	7	9	70
8,000 to 10,000	12	9	6	6	—	1	34
10,000 to 15,000	4	7	4	—	4	—	19
15,000 to 2,000	—	1	—	—	—	—	1
20,000 and over	1	—	1	—	—	—	2
Total	574	200	235	229	148	337	1723

HOLLAND

100 to 500	101	79	40	53	67	47	387
500 to 1,000	37	22	8	6	7	12	92
1,000 to 2,000	70	43	23	15	20	18	189
2,000 to 4,000	58	49	33	23	17	4	184
4,000 to 6,000	36	15	17	26	8	6	108
6,000 to 8,000	42	36	14	2	6	..	100
8,000 to 1,000	18	9	2	—	—	—	29
10,000 to 15,000	3	2	—	—	2	—	7
15,000 to 20,000	2	—	—	1	—	—	3
20,000 and over	—	—	1	—	—	—	1
Total	367	255	138	126	127	87	1100

GERMANY

100 to 500	238	161	115	115	50	136	815
500 to 1,000	72	20	57	37	31	88	305
1,000 to 2,000	64	14	14	29	23	38	182
2,000 to 4,000	37	3	4	1	16	26	96
4,000 to 6,000	33	4	6	11	15	5	74
6,000 to 8,000	33	—	7	7	1	—	48
8,000 to 10,000	6	1	—	1	1	—	9
10,000 to 15,000	1	—	—	—	1	—	2
15,000 to 20,000	—	—	—	—	1	—	1
20,000 and over	—	1	—	—	—	—	1
Total	484	204	203	210	139	293	1533

JAPAN

100 to 500	294	213	83	89	44	100	823
500 to 1,000	144	76	20	31	10	52	333
1,000 to 2,000	113	32	3	24	13	73	258
2,000 to 4,000	75	41	14	20	35	119	304
4,000 to 6,000	122	18	12	8	18	22	200
6,000 to 8,000	10	6	1	1	—	—	18
8,000 to 10,000	10	6	1	1	—	—	18
10,000 to 15,000	4	2	3	—	2	—	11
15,000 to 20,000	—	—	—	—	—	—	—
20,000 and over	—	—	—	—	—	—	—
Total	808	401	142	175	128	372	2026

A—Under 5 years. B—5 and under 10 years. C—10 and under 15 years. D—15 and under 20 years. E—20 and under 25 years. F—25 years and over.

New York.—The White-Star Liner Majestic arrived in New York on August 23rd one day late, after having completed at sea a piece of work that is stated to be the most extensive ever undertaken on a liner under such conditions. Before the liner sailed it was discovered that the supports under one of her large propelling turbines had slipped out of position. Chief Engineer Wolff, with a staff of seventy men, undertook to replace the supports in transit, so as not to delay the sailing of the steamer. The job occupied thirty hours. During that period of time her other three turbines propelled the ship, and passengers were not aware of any reduction in speed.

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A Charming Inconsistency

WE CANNOT help but admire the colossal nerve of the Union leaders in the United States, who adjured the miners in Great Britain to mine no coal for shipment to the States, and the seamen not to carry it across the Atlantic. The reason, of course, was that by so doing, the miners and sailors would be helping to break the strike, and deprive their fellow unionists of the advantages they sought to win from it.

It is only a very short time ago that the miners of Great Britain were carrying on a losing battle with the mine owners, and we might add, the general public, to force the nationalisation of the mines. Their demands were so preposterous that success was never in sight, but they certainly succeeded in tying up the trade of the country, and causing millions of pounds worth of damage. Some mines in fact never recovered from the effect of the maintenance men being withdrawn, which caused such serious flooding that in case of the older mines no attempt was made to de-water them when the strike was over.

During this time the United States shipped millions of tons of coal to England itself, and also to all the European markets which were ordinarily served by the British coal mines. There was no hesitancy on the part of the American union miners to get this export coal out of the ground, thereby refusing to assist the British strikers in any shape or form.

They must have very short or very convenient memories, and doubtless thought that the memories of their fellow trade unionists on the English side of the ocean would be just as short, and in addition that they would show a generous willingness to pull other people's chestnuts out of the fire.

Diesel Electric Propulsion

IT IS VERY interesting to note that an American firm, the United Fruit Co., whose numerous vessels are known as the "Great White Fleet," have placed an order for three new vessels with the Cammell Laird Co., of Birkenhead, England.

These vessels are to be fitted with the Fullagar Diesel engine, manufactured by the Cammell Laird firm, and which has been described in our pages on several occasions. These engines will be directly connected to alternating generators, which will supply power to motors direct connected to the propellor shaft. This is the electric drive which has been developed of recent years. A similar vessel the "San Benito" was recently completed for the same owners by the world famed Harland & Wolff.

The peculiar and gratifying thing to Britishers is that while this particular method of propulsion has had a far larger application in the United States than any other place, having been adopted in the U. S. Navy, that British firms have been able to secure these orders at a time when U. S. shipbuilders are clamoring for work. The order will be a welcome one on the Mersey side, where times have not been too good of late. It is to be hoped that it will be but the precursor of many more.

The performance of these vessels will be watched very eagerly by the marine engineering world, representing as they do a distinct departure in marine practice. The Fullagar engine has had extensive trials in a coasting vessel, and since then in a large ocean going steamer, and its performance must have been a meritorious one to lead to such a large order, from a firm on the other side of the Atlantic.

Turbines vs. Reciprocators

CONTRARY to the wide spread belief that the day of the reciprocating engine in marine service is over, the number of this type of engine fitted in vessels built in Great Britain during the last twelve months far surpasses the turbine installations. The reciprocator also has a large lead over the internal combustion engines. It is a noteworthy fact that the "Homeric" of the White Star Line, is the largest twin screw vessel fitted with reciprocating engines afloat, and her engines are of the triple expansion type. Other noteworthy vessels of recent times which have been fitted with reciprocating engines are the "Naldera" and "Narkunda" of the P & O line, both of which vessels are fitted with quadruple expansion reciprocating engines.

There is of course an enormous amount of favorable experience to the credit of the reciprocating engine, which, in the nature of things, it will take a long while for the turbine to equal. Before the introduction of the reducing gear, the turbine was confined to a very small class of high speed, or "express" passenger steamers. The introduction of the reduction gear has been by no means an unqualified success. In the merchant service considerable trouble has been experienced by the failure of these gears. It is noticeable that in naval practice, where the propellers are smaller compared to the merchant practice, and revolutions per minute higher, with correspondingly lighter parts, the reduction gear has given no trouble at all.

The Diesel engine in its various forms, has been adapted to an increasing number of vessels, but it is still in a state of experiment and transition, and we notice that a recently built oil tanker is being fitted with steam reciprocating engines. A large number of shipowners are trying out the internal combustion engine in various kinds of ships, and there should be some valuable experience to go on in the course of the next few years.

Taking it all round, we expect to see the triple and quadruple expansion reciprocating engine, with its freedom from breakdown, and high reliability under all conditions, remain in favor for a long time to come, especially in vessels which trade all over the world, and are absent for long periods from their home ports.

Latest Movements of the C. G. M. M.

Steamer and Voyage		Sailed From	Arrived At	Sailed From	Arrived At	Routed
						Montreal, Aug. 21, 1922.
Aviator	(14)				Mont'l Aug. 12	
Beaver	(14)	Mont'l Aug. 3	Barb'd's Aug. 19	Barb'd's Aug. 21		Montreal, Barbados, Trinidad, Demerara, Montreal.
Britisher	(2)	Vanc'r June 12	Newcas. Aug. 15			Vanc'r, Sydney, Newcastle, Adelaide, Melbourne.
Carrier	(9)	Mont'l Aug. 12	Psd. Cape Race Aug. 16			Mont'l, Avonmouth, Glas'w.
Challenger	(4)	Mont'l July 16	London Aug. 12			Montreal, Sydney, Antwerp, London.
Coaster	(8)	Mont'l July 6	Quebec Aug. 20			Montreal, Barbados, Trinidad, Demerara, St. Kitts Quebec, Montreal.
Command'r	(8)				Mont'l July 21	
Conqueror	(7)	Mont'l June 23	Swansea Aug. 9	Swansea Aug. 19		Mont'l, Campbellton, Dublin, Manchester, Liverpool, Swansea, Mtl.
Construct'r	(1)				Mont'l Aug. 17	
Cruiser	(3)	Iont'l July 26	Chatham Aug. 11			Montreal, Quebec, Chatham, London.
Explorer	(6)	Iont'l July 29	Colon Aug. 19	Panama Aug. 19		Montreal, Sydney, Australia, New Zealand.
Farmer	(20)	Vanc'r Aug. 14	Prince Rupert Aug. 19			Vanc'r, Nanaimo, Oc. Falls.
Fisher	(14)	Mont'l Aug. 3	Kingst'n Aug. 17	Kingst'n Aug. 18		Montreal, Bermuda, Nassau, Kingston, Belize, Mont'l.
Forester	(13)				Mont'l Aug. 18	
Freighter	(3)	Vanc'r Aug. 15	Fras. M. Aug. 16	Fras. M. Aug. 20		Vanc'r, Fraser Mills, Genoa Bay.
Gunner	(4)				Mont'l Aug. 20	
Harvester	(9)	Mont'l Aug. 16	Psd. Canso Aug. 20			Montreal, Barbados, Trinidad, Demerara, Mont'l.
Highlander	(5)	Vanc'r May 31	Newcastle Aug.			Vanc'r, Victoria, Honolulu, Auckland, Sydney. Melbourne, Adelaide.
Hunter	(11)	Mont'l Aug. 6	Louisburg Aug. 10	Louisburg Aug. 11	Psd. C. Race Aug. 12	Montreal, Sydney, Gibraltar.
Importer	(6)	Vanc'r June 13	Madras Aug. 17			Vanc'r, Miike, Bombay, Madras.
Inventor	(5)				Vanc'r Aug. 19	
Leader	(3)	Halifax Apr. 29	Auckl'd July 31	Auckl'd Aug. 4		Halifax, Norfolk, Australia, N. Zealand.
Logger	(6)	Mont'l July 20		Barbados Aug. 15		Montreal, Barbados, Trinidad, Demerara, Quebec, Mtl.
Mariner	(7)	Mont'l July 6	Garston Aug. 5			Montreal, St. Anne des Mont. Martin River. Garston Liverpool.
Miller	(11)	Halifax Feb. 28	Halifax Aug. 17			Halifax, New York, Australia, N. Zealand, Rarotnoga Papeete, New York, Boston, Halifax, Mtl.
Navigator	(16)				Mont'l Aug. 18	
Observer	(21)	Vanc'r Aug. 8	Ocean F. Aug. 11	Ocean F. Aug. 17		Vanc'r, Nanaimo, Oc. Falls, Astoria, San Diego, San Pedro, Frisco.
Observer	(21)	Vanc'r Aug. 19	Astoria Aug. 20			
Otter	(10)	Mont'l July 27	Cardiff Aug. 12			Mont'l, Swansea, Cardiff
Pioneer	(9)	Mont'l July 21	Liverpool Aug. 10			Mont'l Liverpool.
Planter	(5)	Mont'l May 31	Wellington Aug. 15	Wellington Aug. 21		Montreal, Sydney, Australia, New Zealand.
Prospector	(7)	Vanc'r July 18	Shanghai Aug. 14			Vanc'r, Shanghai.
Ranger	(17)	Mont'l Aug. 13	Quebec Aug. 14	Quebec Aug. 15	Psd. Belle Isle Aug. 16	Montreal, Quebec, Devonport London.
Rover	(17)	Nanaimo July 31	San Pedro Aug. 16			Nanaimo, Oc. Falls, San Pedro, Frisco, Astoria, Vancouver.
Runner	(11)	Mont'l Aug. 17	Psd. Fame Pt. Aug. 19			Montreal, Cardiff, Swansea.
Sapper	(24)	Mont'l Aug. 17	Psd. Father Pt. Aug. 19			Mont'l, Charlottetown, St. John's.
Scottish	(2)	Vanc'r Mar. 9	Chemainus Aug. 16			Vanc'r, Australia, N. Zealand, Kobe, Kokohama.
Seigneur	(13)	Halifax Apr. 6	Panama Aug. 18	Celon Aug. 19		Halifax, New York, N. Zealand, Australia, New York.
Signaller	(10)	Quebec Aug. 20				Quebec, Tristo Bay, C.B.
Skirmisher	(3)	Vanc'r July 13	Sydney Aug. 13			Vanc'r, Sydney, Melb'rne, Adelaide, Newcastle.
Spinner	(8)	Mont'l Aug. 17	Psd. Father Pt. Aug. 19			Mont'l, Liverpool, Manchester.
Squatter	(9)				Mont'l Aug. 17	
Transpor'r	(2)	Vanc'r Apr. 15	Frisco Aug. 8	Frisco Aug. 16		Vanc'r, Auckland, Wellington, Sydney, Melb'rne, Newcastle, Adelaide, Honolulu Frisco, Noyo,

(Continued on page 21.)

An International Ship's Load Line

Report to the International Shipping Conference.

THE FOLLOWING is the report to the president of the International Shipping Conference of the sub-committee appointed to deal with the question of the loadline:—

"The International Shipping Conference, held in London on the 23rd, 24th and 25th November, 1921, passed the following resolution:—

"That this conference, representative of the shipping industry in every part of the world, is of the opinion that the time is opportune for the introduction of International Load Line Regulations.

"That with this object a committee be appointed to investigate and determine the form of regulations capable of international acceptance.

"That such committee consist of one member appointed by representatives of each country, and that the registration bureaus and the classification societies be invited each to appoint a representative on the committee, and that the committee appoint a secretary."

In accordance with the terms of the reference as shown, we have the honor to report as follows:—

This committee was duly convened and held its first meeting on Monday, the 22nd May, 1922.

It was agreed that the report No. 10, which had been submitted to the International Shipping Conference in November of last year, should be taken as the basis of discussion, together with the memoranda received from other countries, namely:—

1. Scandinavia, dated Copenhagen, the 25th April, 1922.
2. Germany, dated 26th April, 1922.
3. Holland, dated 24th April, 1922.
4. Holland, undated.
5. Japan, dated 16th May, 1922.

In the course of general discussion it was recognised that the question of allowance for freeboard for certain classes of superstructure was closely associated with the question of tonnage measurement, and that certain anomalies in the assignment of freeboard had arisen on account of the preferential treatment of spaces exempted from tonnage measurement. It was recognised, however, that this question of tonnage was to a certain extent affected by the action of port authorities and others, and it is becoming increasingly necessary for a general agreement to be arrived at on this subject.

As regards the question of freeboard assignment, it was recognised that if a space was totally enclosed, it should have a full allowance for freeboard, and that otherwise the allowance for freeboard should be varied in respect of the means of closing adopted, as subsequently specified.

Discussion also took place on the basic tables of freeboard, and the general opinion was that the freeboard at present required for the usual type of vessels was satisfactory, and that as regards small vessels of usual type, no increase of freeboard appeared necessary.

It was felt that the present freeboards of flush deck vessels required some increase, and it seemed to be generally agreed that all flush deck vessels should be provided with a forecastle or, alternately, if this were not done, there should be a greater increase of freeboard. This increase of freeboard forward might perhaps be obtained by the adoption of suitable sheer.

Particular attention was directed to the standard of strength proposed by the Load Line Committee, and it was observed that in the Japanese regulations on Load Line recently issued, the Load Line standard had been adopted with one slight modification. Opinion was divided on the question, some of the delegates being in favor of the adoption of the proposed standard, others considering that it should be left to the recognised authorities to set up suitable standards.

Deck Cargoes

The conditions of assignment of freeboard, as proposed by the Load Line Committee, were considered at length. The committee were satisfied that the greater part of these conditions had already been adopted by the action of the classification societies, and that it would be preferable at the present time to confine their attention to the main points of the freeboard question rather than to detail the points involved in these clauses.

Reference was made to the determination of freeboard for vessels carrying wood deck cargoes, and attention was drawn to the recent report of the Deck Cargoes Committee of the International Shipping Conference on this subject. It was observed that this report did not agree with the observations of the Load Line Committee on this question, and that the rules already proposed in the report referred to provide for the assignment of freeboards for vessels carrying such cargoes by allowances based on the freeboard regulations for a steel steamer.

This committee, in common with the previous committees on sub-division and on deck cargoes, experienced difficulty in regard to variations of freeboard permitted for different seasons of the year and for different geographical regions. They confirmed the opinion already expressed by the other committees that it was very necessary that the governments of maritime countries should take common action to define the summer and winter season, not only for the North Atlantic region, but also for other regions of the globe where similar treatment might be suitably and safely granted.

It is to be observed that when this question of regional variation is under discussion, special regard should be paid to certain waters, which might be regarded as inland seas, such, for example, as the Baltic, which is sometimes regarded as suitable for favored terms in respect of maritime legislation.

The committee were agreed that the application of those rules would only affect the freeboard of ships to be built, and that the proposals should not be made compulsorily retrospective to vessels already in existence. They were further of opinion that these rules were framed for international ocean-going trade.

It was observed that the rules proposed by the Load Line Committee did not make provision for the assignment of freeboards to vessels of exceptional types or forms, and it is presumed that some special schedule of requirements in regard to such vessels would need to be laid down at a future date.

Freeboard and Stability

The committee then proceeded to deal in detail with the report of the Load Line Committee, and in regard to the question of stability, were of opinion that it was only necessary to state that the assigning of a freeboard mark did not give any guarantee as regards the stability of a vessel. The clause that requires a master to exercise authority in this respect should therefore be deleted. There was, however, an opinion expressed that certain countries might find it desirable to retain this clause or to substitute for it any other that conformed with the law of the country.

The definition of freeboard and the methods of marking were generally agreed to.

The definitions of standard types of vessels and of the principal dimensions were generally concurred in, except that some opinion was expressed that it was desirable in all these technical regulations to have a uniform definition of length. The committee were of opinion that in vessels with cruiser sterns, the length should be taken to the centre of the rudder stock, or to 96 per cent. of the total length over all, whichever was the greater, subject, however, to a reservation on the part of the Norsk Veritas and the Technical Advisor for Denmark as to this altered reading.

The characteristics of standard vessels were next considered, and the ratio of length to freeboard depth and standard round of beam were agreed to and the bases of the table for determination of freeboards (Article 8) were also concurred in.

The committee proceeded with the discussion of the correction to be made to the freeboards for departures from the standard, and were generally in agreement with the corrections necessary for the variation of length to depth ratio, for sheer correction and for round of beam correction. The question of immersion of the freeboard deck, as contained in Article 16 of the Load Line

Committee's Report met with the approval of the committee.

The question of the standard height of superstructure was first of all discussed by the Technical Sub-Committee, and it was agreed that: —

The last clause of Article 7 (d) of the Load Line Committee's report should be amended to read as follows: —

(a) The standard height in feet of superstructures which are fitted abaft amidships is 3 ft. when the length of the vessel does not exceed 100 ft. and 5 ft. when the length of vessel is 350 ft. and above.

(b) The standard height in feet of superstructures which are fitted forward of amidships is 5 ft. when the length of the vessel does not exceed 100 ft. and 7 ft. 6 in. when the length of the vessel is 350 ft. and above.

(c) For intermediate lengths the standard height is to be obtained by interpolation.

It is to be observed that this recommendation sets up a standard height for after superstructures, as well as for forward superstructures.

The sub-committee also considered the most important subject of the basic freeboard table, as contained in the appendix to the Load Line Committee's Report. The committee were generally in agreement with those tables for flush-deck vessels, but the representative of the Norske Veritas considered that the freeboard should be larger for such vessels.

Considerable discussion necessarily arose on Article 13 of the Load Line Committee's Report dealing with the allowance to be granted for superstructures with various types of closing apparatus, and the committee were of opinion that the allowances, as contained in Table 2 of the Load Line Committee's Report should be modified in accordance with the following recommendations:

In regard to the question of closing appliances it was agreed that 100 per cent. allowance should be given to shelter deck vessels with a tonnage opening closed with closing appliances (stormboards full height), fitted at each end of the tonnage well. It was agreed that full allowance should be given for bridge houses which were closed by class 1 appliances at the fore end, and either class 1 or class 2 appliances at the after end, in conjunction with open scuppers. In the case of a combined poop and bridge, it was agreed that the full allowance should only be given when the openings, if any, were closed with class 1 appliances.

It was further agreed that portable plates, whether secured by bolts through the bulkhead plating, or by hook bolts, should be included in class 2 closing appliances, but that storm boards of half height should be regarded as non-existent.

The question of a standard sheer was investigated, and the recommendations of the Load Line Committee were agreed to, subject to a reservation on the part of one of the Dutch representatives. The Norwegian and Swedish representatives also made a reservation in regard to the case of shelter deck vessels having a tonnage opening aft, and were of the opinion that in such cases the sheer should be measured relative to the shelter deck and not to the upper deck.

Wood And Composite Vessels

The committee had under consideration the modifications which could be made to the regulations for the assignment of freeboard for wood and composite vessels, and for this purpose they recommend that:—

(1) The length shall be measured in the same manner as for a steel vessel.

(2) The breadth shall be measured to the outside of the planking amidships instead of the outside of the frame amidships.

(3) The freeboard depth to be used with the tables is the vertical distance amidships from the point where a continuation outwards of the upper surface of the freeboard deck intersects the outer surface of the shell or planking to the level of the top of the keel in steel and iron vessels, and to the lower edge of the rabbet of the keel in wood and composite vessels. When the form of the lower part of the midship section is of a hollow character, the depth is, however, to be measured to the point where the line of the flat of the bottom continued inwards cuts the side of the keel. When the rise of floor exceeds 1½ inch per foot of half breadth, the freeboard depth may be reduced by half the difference between the total rise of floor at the half breadth and the total rise at the standard rate of 1½ inch per foot. Two and a half inches per foot of half breadth is, however, to be the maximum rate of rise on which an allowance is to be made.

The committee were also of opinion that this definition of depth might with advantage be substituted for the definition given in Article 6 (c) of the Load Line Committee's report.

It was agreed that the computation of the freeboard of sailing vessels should be in accordance with the rules for steamers, such an addition being made as would bring the assignment into practical agreement with the present summer freeboards for such vessels. The summer and winter marks could be treated on the same basis as that laid down for sailing vessels.

The committee were very much exercised with the definition of the term "steamer," as contained in Article 1 (a) of the Load Line Committee's Report. They were of the opinion that consideration should be given to the question of speed and power, and suggest that some minimum brake horse-power should be associated with the load displacement of the vessel.

It was not possible at present to determine a satisfactory standard, but it is recommended that this subject be left over for further study. A suggestion was put forward that, where the brake horse-power is less than 50 per cent. of the standard to be set up, the vessel should be treated as a sailing ship, and that where the power provided exceeds 50 per cent., and is less than 100 per cent. of the standard, a proportionate allowance should be made as between the freeboards required for sailing vessels and for steamers.

London:—The "Montclare" the last of the new Canadian Pacific liners, has gone through her trials successfully and will be added to the Liverpool Montreal service. She is the fifth vessel, and her coming will release the "Empress of Britain" which will shortly go on a Mediterranean cruise.

Port Arthur:—A strike of freight handlers at the docks here is tying up traffic and passenger boats are being unloaded by deck hands and bell hops. C. P. R. clerks and officials are helping to unload the "Assiniboia." The men who were getting 33 to 37 cents an hour, are demanding 40 and 42 cents.

London:—London and Liverpool grain importers are pressing on Mr. J. A. Robb, the Canadian Minister of Trade and Commerce, the importance of shipping Canadian grain through Canadian ports, where supervision can be exercised over it at all times. They say that in future they will insist on all shipments coming through Canadian ports.

Brockville:—The Canadian Vickers seasled, while en route from Montreal to Toronto struck a shoal in the St. Lawrence, about seven miles west of Brockville. She had 18 passengers aboard at the time, but fortunately was not travelling at full speed, which is 42 miles per hour. The hull was undamaged, but repairs were necessary to the propellers and shafts.

Levis:—At a meeting of the Levis Board of Trade, presided over by Mr. Alex. Morency, it was moved by Mr. J. Langlois, and seconded by Mr. Patrick Doyle, that a representative of the South Shore be appointed as a member of the Quebec Harbor Board. Levis has been fighting for this representation for a long time. A copy of the resolution was sent to Mr. Crerar, leader of the Progressive party in the House of Commons.

Vancouver:—It is reported from Vancouver that Mr. A. Melville Dollar, managing director of the Canadian Robert Dollar Co., has resigned his position, and also the treasurership of the Pacific Steamship Co. which he also held. It is understood that Mr. Kenneth J. Burns, who has been for several years the Vancouver manager of the company, will be appointed managing director. Mr. Burns is very well known in British Columbia, having for a long time been agent for the Great Northern Railway.

Safety at Sea and the Use of Wireless

FOLLOWING is the report of the International Committee on Life-Saving Appliances and Wireless Telegraphy to the president of the International Shipping Conference:—

We were appointed under a resolution of the International Shipping Conference, passed in November, 1921, which defined the principles upon which any further consideration of that part of the problem of safety of life at sea which more particularly relates to life-saving appliances should be based, our terms of reference being contained in paragraphs 10 and 11 of the resolution, reading as follows:—

(10) That each association of shipowners represented at this conference should nominate representatives to serve on a committee (a) to investigate and report upon the details of such modifications in respect of life-saving appliances and wireless telegraphy in the Convention of London as may appear necessary in the light of experience and upon the basis of the principles accepted by the conference, and (b) to take such steps as may be necessary to secure the international adoption and application of such modifications by the governments concerned.

(11) That such committee should have power to secure the assistance from time to time of technical assessors and others in an advisory capacity and to determine the time and place of its meetings.

At the invitation of the Chamber of Shipping of the United Kingdom we met in London on May 22nd and 23rd, 1922. On the motion of M. J. Rypperda Wierdsma, seconded by Mr. W. H. J. Oderwald, Sir Alan Anderson, K. B. E., was unanimously elected chairman of committee. We then proceeded to consider in detail the interpretation and application of the principles laid down at the conference. It was agreed that the Convention of London, 1914, should be taken as the basis of our discussion, but we had continuously in mind the principles underlying the report of the Merchant Shipping Advisory Committee, 1912, with which we are in agreement. In our opinion, a cardinal error was committed by the government's signatory to this convention in departing, at the instance of a natural but uninformed agitation, from the principles contained in this report and in substituting therefor other principles which failed in any degree commensurate with the anticipation of such governments, to save life after marine casualties.

The Egypt Disaster

The committee were about to meet when they received the news of one more of those terrible disasters which it has been the object of all civilized peoples, and not less of governments than of their subjects, to render less and less fatal. We felt it our first duty, therefore, to convey in the following resolution our deep sympathy with the sufferers, and with the owners, master, officers and crew of the vessel. Nor did we consider that we should be other than failing in a public duty if we omitted to connect this disaster with the recommendations we make.

The Egypt sank in a smooth sea and help was close at hand. Those of her ship's company who could support themselves in the water had a good chance of rescue, while a number of the "boats for all" securely attached to davits went down with the ship.

Since the Titanic one ship after another has taught us always the same lesson—the Egypt is the latest, but will not be the last, unless we take the lesson to heart that the Merchant Shipping Advisory Committee gave wise advice to the Board of Trade in their report of 1912.

To the main recommendations of that committee the International Shipping Conference adhered in their resolution of November, 1921, and now again with the disaster of the Egypt, fresh in our minds, we urge them upon our governments.

Resolved.—1. That this committee of the International Shipping Conference, having learnt with deep regret of the loss of life and property involved in the sinking of the Peninsular and Oriental Steam Navigation Co.'s vessel Egypt, extend their heartfelt sympathy to the bereaved and to the management, master, officers and crew of the vessel.

2. That the attention of the Board of Trade be drawn to this disaster, and to the fact that the opinions expressed at the International Conference are hereby confirmed as follows:—

(i) The Board of Trade referred, after the loss of the Titanic, the whole question of boats and life-saving appliances to the Merchant Shipping Advisory Committee.

(ii) That committee reported in favor of certain principles being adopted by the Board of Trade.

(iii) Had these recommendations been fully acted upon, subsequent experience under conditions both of war and peace shows that loss of life at sea might have been diminished.

(iv) Nevertheless, the government's signatory to the Convention of London proceeded upon other principles which shipowners then feared, and which have proved to be detrimental to safety of life at sea.

3. That all governments be accordingly invited to take immediate steps to revise the Convention in accordance with the report of the Merchant Shipping Advisory Committee, 1912, as amplified by the recommendations of the committees of the International Shipping Conference concerned with safety of life at sea.

Wireless

After consideration of the articles of the Convention of London relating to wireless telegraphy, and having taken into account memoranda submitted on behalf of the German and Italian delegates, we desire to recommend the following amendments thereto:—

Art. 32. It was agreed:—1. That in order to allow for partial as well as total exemption of coasting and short sea trade vessels, the opening sentence of the second paragraph of article 32 should be amended to read as follows:—

"Moreover, the governments of each of the contracting States, if they consider that the route and conditions of the voyage are such as to render radio telegraphic installation unnecessary or to render a modification of these requirements reasonable, may exempt or modify the above requirements or the conditions under which they are to be enforced in their application to the ships....."

2. That Paragraph 2 (Sub-section 1) should be amended by the substitution of the words "200 sea miles from the nearest coast" for the words "150 sea miles from the nearest coast."

Art. 34. It was agreed that the following words be added to Article 34 after the words "high contracting parties" in the last paragraph but two:—

"An automatic calling apparatus shall be deemed efficient if it can take the distress signal and the safety signal and reaches 80 per cent. efficiency in an open sea test under service conditions.

"The shipowner may employ a navigating officer or other member of the crew in lieu of a wireless operator providing such person has qualified for a special certificate of competence to receive and transmit wireless signals in connection with safety of life at sea. Such person shall not be required to keep any specified watch on the wireless instrument provided that he is always available in the case of emergency and that the continuous watch when required by the Convention is kept by automatic or human agency."

Art. 35. It was agreed that the first paragraph of this article should be altered to read as follows:—

"The radio telegraphic installation required by Article 31 above shall be capable of transmitting clearly perceptible signals for the purpose of safety of life at sea from ship to ship over a range of at least 100 sea miles by day under normal conditions and circumstances."

General Recommendations

We have considered this question, and find that the basis provided in Article 31 of the Convention is logical and satisfactory: this number should refer to those actually on board in accordance with the Convention and not to the number of those for whom the ship may be certificated.

In the event of the government of any State signatory to the Convention exercising the powers of Article 32 in the sense of differentiating between passenger and cargo vessels under sub-section 1, we recommend that the obligation to carry wireless shall not in any event be placed upon passenger vessels

unless they have 100 passengers on board.

Automatic Device

The more consideration we give to the use of wireless for saving life at sea the more we are led to confirm in the strongest terms the view expressed by the International Conference that the most immediate need in connection with the use of wireless is the development and approval of an automatic device. Some doubt, however, having been raised on the committee as to whether the apparatus in its present form was sufficiently developed to allow of its early or immediate adoption, we invited technical representatives of the different wireless companies in Great Britain to give evidence on this point. Evidence was accordingly received from Commander A. J. Slee, representing the Marconi Company, and from Mr. R. Ferguson, on behalf of the Radio Communication Company. Mr. H. Machin, manager of Messrs. Siemens Bros., Ltd., was unable to attend, but he has since told us that while he believes it to be impossible for an automatic device to record the existing S. O. S. signal he hopes that with an altered distress signal an effective automatic device could be put on the market.

Two kinds of automatic devices were described to us, one produced by the Radio Communication Company to respond to the existing S. O. S. signal, the other, which both the Radio Communication Co. and the Marconi Co. are able to produce, suitable for adoption in the event of an alteration of the distress signal.

The evidence given by Mr. Ferguson appears to us to establish that under conditions for which the Radio Company devised their instrument the instrument with other stations which apparently led to its rejection by the British authorities, would be limited to calls from stations having a greater power than that issuing the distress call, and even under the least favorable conditions we were informed that 80 per cent. efficiency was obtained.

It is obvious that the greatest risk of interference with an automatic device by jamming occurs just in those places where there are most ships available to help, and just at those times when many operators on those ships are using their instruments and will at once hear any distress signal.

The representatives of the Marconi and Radio Communication Companies stated that if the alarm call were altered there would be no difficulty in providing an apparatus to take such altered signal with an even greater percentage of efficiency than that of the instrument described above. The Marconi Company mentioned that a trial under Post Office supervision of their instrument designed with this object had resulted in three to four out of each five calls being successfully recorded at a distance of 100 miles under service conditions at sea with unselected operators. The rejection of this apparatus in its existing form had been justified owing to the presence of a purely electrical defect, but the trial had at least established the satisfactory form of the device, and the company anticipated that before the end of the present year this defect would be remedied and a satisfactory instrument produced. The Radio Company stated that an instrument of a high percentage of efficiency capable of responding accurately to the suggested new call and adaptable to any other call composed of the same elements could be offered for immediate use. We wish to emphasize, however, that it is not reasonable to expect wireless companies to submit for trial or embark upon the manufacture of these instruments until the conditions of their trial and acceptance by the authorities have been definitely laid down.

It was accordingly resolved:—

(a) That the governments of the various maritime States be urged again to apply themselves to the immediate approval of an automatic device to receive emergency calls;

(b) That with this object the purpose which such instrument is required to meet should be restricted to the taking of emergency calls under ordinary service conditions at sea; and,

(c) That existing devices should at once be re-tested under the same service conditions with the object, if possible, of approving immediately a device which will respond under normal service conditions at sea to the existing distress call, but that if this is not possible active steps should be forthwith taken to agree internationally upon a new distress call which is capable of being so taken.

Wireless as a Navigational Duty

We discussed the suggestion put forward by the International Conference that where wireless is required for ship's service only the wireless operator as a separate class should be gradually replaced by navigating officers or others engaged in ordinary duties on board, provided they hold certificates of competence to operate the instrument for ship's service. We recommend to this end that apprentices should be trained in wireless as in navigation, and that existing masters and navigating officers should be encouraged to take a wireless course to secure their certificates and that each government should institute a special examination and certificate of competence to operate the instrument for ship's service, including safety of life at sea.

Directional Wireless

We attach the greatest importance to the development of this branch of wireless telegraphy, but we think it necessary to point out that a navigational instrument which will add to the safety and decrease the cost of running ships is of such commercial importance that shipowners may without risk be left to choose their own time and method for its adoption, and that the fewer government regulations that are applied to it the more satisfactory and the swifter will be its development. In the same way we desire to encourage shipowners to make use of wireless for the receipt of time and weather signals, but we are strongly of opinion that this is a point upon which government interference would be quite inappropriate.

We have also given consideration to the inspection and testing of radio apparatus which is or may be demanded by the authorities in different countries, and are of opinion that insofar as wireless installations are supplied under contracts which oblige the wireless companies to supply and maintain such instruments in accordance with government requirements, government inspection is either an altogether needless expenditure of public time and money or at any rate should be limited to an annual test.

Life-Saving Appliances

It was reported to us that the British Government has again remitted to the Merchant Shipping Advisory Committee of the Board of Trade the question of life-saving appliances, with an instruction to revise the appropriate sections of the Convention of London in accordance with more recent experience.

We have already stated our opinion that the principles enunciated by this committee which were reached in 1912 were sound, and that every successive failure of the regulations adopted by the various governments in contradiction of their report has only served to confirm the wisdom of their first decisions. We here desire to express the hope that the Merchant Shipping Advisory Committee will reaffirm the principles then established as amplified in the terms of the resolution passed by the International Shipping Conference and which it has been our task further to interpret. In particular we endorse the principle that boats in excess of those which can readily be launched are an encumbrance and a danger and that in a disaster many lives may be saved by light and handy bouyant apparatus.

Since the "Titanic" a series of disasters at sea proves the danger of encumbering the decks with boats which cannot be launched, and the need for bouyant apparatus which can easily be handled or will float off when the ship sinks and give support till rescue comes.

These general principles have been translated into specific recommendations for the amendment of the Convention by our Technical Sub-Committee in their report, which we attach and unanimously commend to the conference.

We desire to reaffirm the resolution of the International Conference:—"That inasmuch as International Conventions become valueless, if any contracting government applies different rules, whether less or more severe, to all ships visiting her ports, the attention of governments signatory to the Convention should at once be called to instances in which the international accord of the Convention has been disturbed by particular regulations in order that the disturbance may be removed."

Some Notes On The History of Insulation

The Use of Protective Covering From the Dawn of History to the Present Day is Briefly Outlined in This Article, and the Origin of 85 Per Cent. Magnesia Explained

By T. W. CAVEN

NATURE has given all animals a protective coat against the elements. This coat is of such a nature that it either keeps the heat of the body from being dissipated so rapidly that life cannot be sustained, or such that it keeps the sun's rays from becoming unbearable. Animals living in cold climates are given the most efficient heat insulation found in nature—hair and a thick layer of fat.

In the dawn of civilization man learned that in order to stand the cold it was necessary for him to have some other kind of a protective covering than that which nature had given him. In looking for one, he took that which was nearest and easiest to obtain—the skins of the animals which he had killed.

He first wore the skins of animals as a protection against the elements. The hair was worn on the outside as an ornament in most climates, but in the winter it was worn on the inside, as the aborigine soon found it was much warmer. Of course, the air cells of the hair give the best protection. The more fortunate, or rich—if we may call them such—wore the finest or softest skins since these were warmer. This was due to the greater number of hairs in a given area. Little did the savage think that he was applying the fundamental law of thermal insulation that the greater the number of air cells to a given space, the better the insulation.

Man living in tropical climates seldom clothed himself in furs. He used instead garments of grass or the fibres of plants, to protect himself from the hot rays of the sun.

The first mention of a material used for heat insulation is found in the works of Herodotus. He speaks of seeing brick which floated. They were used by the Romans to put behind marble slabs to keep the heat from being lost by radiation. Some of these bricks have been found in the ruins of the baths of Rome. We now know that they were made of infusorial earth found in the northern part of Africa, where the same kind of material is being mined and used for the same purposes to-day.

A large number of the early writers speak of the use of infusorial earth for the purpose of keeping the heat in chimneys so as to give better draft and to decrease the soot that forms on cold surfaces. In all references they call attention to the fact that brick made of this earth are much lighter than those made of other earth (clay).

Insulation of Steam Engines

James Watt, when he made the discovery that the cylinder of a steam engine should be kept as hot as possible, put wood around the cylinder to keep the heat from being carried off too rapidly. This practice was followed up to a very few years ago, as low pressure steam was used and the heat was not high enough to cause the breaking down of the wood.

Count Rumford is given credit of being the first to mention the use of diatomacious silica as a heat insulating material. He used it about 1790 in the construction of fireless cookers which he had made at the time he was feeding the poor of Bavaria at public soup kitchens. It was due to his discovery that the fireless cooker is so widely used in Europe at the present day.

Authentic data and dates as to the use of heat insulating materials, from this point of time, are rare and of little value. However, with increased pressure of the steam used for power, it became necessary to reduce the loss due to condensation to a point where the loss was not greater than that gained by the higher pressures. Also, since it was necessary to have the steam lines of greater length than had been thought possible in the past, some way had to be found to stop the loss due to condensation in the pipe lines.

The First Scientific Insulation

There is little queston that hair-felt was the first material to be used for insulating heat surfaces. This was due to the fact that wool was the best insulating material then known to man. The use of felt was, in all probability, discovered by some one who had a steam pipe exposed to the weather so that in cold weather the steam condensed to such a point that only water came through. No doubt wrapping the pipe with a piece of wool cloth was tried; and as the condensation was stopped, it was but a short step to a hair-felt covering, since this material was much cheaper than woven cloth.

Felt is an excellent insulating material where low temperatures only are to be taken into consideration, but owing to its poor heat-resisting qualities, it is of no value for temperatures over the point where the material breaks down. It has the lowest conductivity of any of the commercials in use, and is used largely in the insulation of cold storage plants where a flexible material is required.

Cork, flax, wood, and other vegetable materials have been tried but with poor success, because of the low breaking-down point of the material. This causes dry rot or carbonization.

Cork is at present one of the most universally-used materials in the building of cold storage plants. It has low thermal conductivity and light weight, and will resist the action of water better than any of the natural materials. The cost is largely in its favor as its application is easy. The usual method is to use it in large sheets or blocks.

Prejudices Against Insulation

At one time in the last century the advisability of insulating boilers or steam pipes was a question. Writers of that period said that if the surfaces were clothed, the surfaces would rust to such an extent that boilers would be very dangerous; also that the upkeep on steam lines would be greater than the saving. It is hard to believe that less than half a century ago what is known to-day as modern heat insulation was unknown. High pressures of 100 lb. to 300 lb. were thought to be impossible, and superheat was not even considered.

Pipe and pipe boiler coverings there were, of course. Many strange combinations of materials, such as lath and plaster, lasters filled with wool of sheep, plaster filled with slag, straw, chaff, hair, and vegetable fibres were given in some of the works on the handling of steam plants.

In 1883, Prof. J. M. Ordway, of Boston, made for the Mutual Fire Assurance Companies of Boston, a series of tests as to the origin of a number of fires resulting from "spontaneous" combustion of pipe and boiler coverings. We read in his report a list of coverings which, to say the least, are strange. Here are some of them:

Slagwood in wooden cages covered with burlap or cloth.

Asbestos fibre, then asbestos paper, then hairfelt, then cloth.

Clay, then paper, then hair-felt, then lath and plaster.

Fossil meal, plaster with hair, cloth covering.

Many other combinations are mentioned and some of them are forerunners of some of the best coverings on the market to-day.

Some of Ordway's tests are interesting. He found that "rice chaff moistened with water glass was more efficient than straw rope." When he stated that fibrous or porous matter acts mainly by virtue of its entrapped air, he struck the keynote of modern insulation, but as we find no mention of it anywhere else than in his report, it is hard to believe that he realized the great importance of this statement or that any one else saw anything in it.

Professor Ordway was one of the first to recognize the importance of sectional pipe covering for pipes after they had been installed. He recognized the ease of installation, and, in case of repairs,

Latest Movements of the C. G. M. M.

(Continued from page 15.)

Traveller	(4)	Vanc'r Aug. 12			
Victor	(8)	Mont'l July 4	Colon July 22	Panama July 22	Vanc'r, Auckland.
Volunt'r	(14)	Mont'l July 21	Preston Aug. 13		Montreal, Australia N. Zealand.
Winner	(6)	Vanc'r Aug. 12	Psd. Flattery Aug. 13		Mont'r, Chalcur, Cardiff.
Tolmie	(2)	Vanc'r July 10			Vanc'r, Yokohama.
					Vanc'r Australia.
Ranger	(12)	-	-	-	Mont'l May 16
Rancher	(9)	-	-	-	Mont'l May 17
Trapper	(12)	-	-	-	Mont'l June 23
Trooper	(14)	-	-	-	Mont'l July 9
Advent'r	(11)	-	-	-	Midland Apr. 23
Engineer	(2)	-	-	-	Goderich Dec. 3
Pathfind'r	(2)	-	-	-	Midland Dec. 4
Sailor	(17)	-	-	-	Goderich Dec. 4
Sower	(11)	-	-	-	Midland Dec. 6
Trader	(13)	-	-	-	Midland Dec. 4
Drummond	(7)	-	-	-	Collingwood June 9
McKee	(4)	-	-	-	Goderich Dec. 12
Miner	(18)	-	-	-	Halifax Nov. 25
Sealer	(14)	-	-	-	Halifax Dec. 29
Settler	(11)	-	-	-	Halifax Jan. 13
Voyageur	(12)	-	-	-	Halifax Dec. 15
Warrior	(9)	-	-	-	Halifax Jan. 19
Sheba	(3)	-	-	-	Halifax

the ease with which it could be taken off the pipes without too great a loss when replacing.

In 1884 Professor Ordway stated that "at first sight it may seem as though magnesium is too costly to be taken into account, but there is nothing but the lack of demand to hinder a very economical production of magnesia alba."

Origin of 85 Per Cent. Magnesia

In 1885 H. M. Hanmore, a practical pipe-coverer, began to use magnesia carbonate with his covering materials. He consulted with Dr. R. W. Mattison, who at that time was a large manufacturer of magnesia products. Dr. Mattison saw the possibilities of magnesia as he had been having trouble with his drying room because the magnesia powder settled on the steam pipes and cut off the heat. The doctor was not an engineer, but took advantage of Hanmore's suggestions, and after many experiments, developed what is now known as 85 per cent. magnesia.

It was about this time that the question came up as to whether the covering of boilers and steam pipes was advisable. There were many arguments pro and con, and even as good an authority as Roper was in doubt as to the advantage of it. He states in his handbook, published in 1892, on Clothing Marine Boilers, "Although it must be allowed that in all cases the clothing of marine boilers with non-conducting substances, such as hair-felt, wood, etc., is highly advantageous for the production of steam, yet this practice is alleged in some instances to have induced a rapid wear in the plates of the boilers. This unlooked for result is most apparent in boilers which are frequently used and disused alternately, the corrosion taking place on the interior surface."

It is hard to realize that such theories could have been held at such a late date as the above, but when we consider that even at this time there are a number of engineers who raise the question of damage to the furnace walls in case insulation is used, it is not hard to see why so many years passed before there was any serious effort made to work out the problems of insulation.

Nineteen hundred two saw the first effort to get any basic facts in regard to what insulation meant to the plant operator. That effort was the first step toward finding what the cost was and what profit could be expected from the investment. It was made by Henry M. Scott, who made tests of what was at that time the largest steam plant in the world, that of the Manhattan Railways Co. His conclusions as to the items to be considered are most interesting and can hardly be improved upon to-day.

They are:

Investment in insulation.

Cost of coal to supply lost heat.

Five per cent. interest on capital invested in boilers and stokers rendered idle through supplying lost heat.

Guaranteed life of covering.

Thickness of covering.

Scott decided on magnesia as being the best at that time. His method of making the test was very interesting, as it was the forerunner of the present method of making tests of insulating materials, did away with the uncertain methods of the past and brought into use methods which deal only with known facts. We will see later what these facts mean and why they are used.

It is too bad that Scott did not give us some report on the state of the art in Europe at that time, as the Germans had gone to the point of bringing out a very efficient insulation in the shape of brick and covering made from kieselguhr. Had Scott made any investigations of this material they would be of great interest at this time.

So much for the general history of insulation in the past. There were many investigators who made a very exhaustive study of the thermal conductivity of materials, but it seems as though they did not take into consideration any commercial or practical value of effecting a saving in fuel. They were interested only from the scientific standpoint.

We can take up any standard work on the transfer of heat and find any number of references made to the work of men as far back as the early part of the 18th Century. It is rather strange, then, that all of the work which had been done on this subject was allowed to lie dormant so long and that it is just now being brought to a point where we are realizing the fruits of all the endeavors.

BOOK REVIEW

An excellent book for the marine engineer, whether he be superintendent, draughtsman, or operating, has been written by Lawrence B. Chapman, Professor of Naval Architecture, Lehigh University, and published by the McGraw Hill Book Company, New York. The volume contains nineteen chapters. A short introduction gives way to a review of thermo dynamics, fuels, boilers, combustion and draft. From then on a consideration of every type of marine machinery is taken up, and their advantages and disadvantages compared. An interesting chapter is devoted to layout, and typical illustrations given, while the succeeding chapter gives the computations necessary for the design of a marine power plant. The book sells for $4 in the States.

Marine News From Every Source

Mackinaw City, Mich.:—The steel barger "Bryn Mawr" of the Pittsburgh Steel Co., downbound, collided with the schooner "City of Grand Haven" upbound. The schooner sustained severe damage to her bow, being opened up pretty nearly to the water line. She will have to be lightered before she can be towed to Milwaukee.

Cleveland:—Shippers are having trouble handling ore at the lower end of the lakes, as storage at some of the furnace yards is about full up. Considerable ore is on the dock. Since July 14th, 42 furnaces were put out of commission on account of shortage of fuel, and if they are out very long their requirements will be cut.

Cleveland:—It is proposed to pool all coal for lake shipment, in order to speed up deliveries, starting about Sept. 1st. A meeting of all lake coal forwarders was called for this purpose to meet in Cleveland on Aug. 21st. Lake shippers have put up a bond to guarantee payment on coal sent to the lake front by shippers having no lake connections.

Sydney:—Several steamers and sailing vessels were tied up here as a result of the shippers and trimmers ceasing work when the miners went on strike. There are about one hundred shippers and probably a few more than a hundred trimmers affected. There were six steamers and seven schooners partially loaded when the men ceased work.

Toronto:—The premises of the Dominion Shipbuilding Co. at the foot of Bathurst Street have been sold to the Dominion Envelope and Carton Co., according to press reports of recent date. The premises at the time of liquidation were valued at $532,624.

Detroit:—A small ocean going tramp the "Modena" of Norway, was anchored off Detroit a few days ago. She is bound for Milwaukee, where she will load a cargo of grain, and take it overseas. There are at present several boats enroute from ocean waters to the lakes, they having been acquired by vessel owners for this trade.

Buffalo:—It is understood that the Detroit and Cleveland Navigation Co. are going to build two new steamers for the Buffalo-Detroit Division, each costing $3,000,000, if certain conditions are fulfilled. These conditions have to do with the La Folette Seamen's law, the provisions of which in regard to the number of men to be carried will have to be modified if the ships are to be built. If the act is modified it is stated that upwards of $10,000,000 shipping for passenger companies will be started. Under the act U. S. steamers are compelled to carry one third more men than Canadian vessels of the same class.

New York:—During the voyage of the White Star Liner "Adriatic" from Liverpool to New York, an explosion of unexplained origin occurred in number three hold, resulting in the death of two of the crew, and injury to several others. The vessel at first sent out wireless signals of distress, but later reported all well, and that she was proceeding under her own steam.

Brooklyn, N. Y.:—A lighter which was receiving the cargo of the U. S. Shipping Board steamer "West Jaffray," consisting of nitrate of soda from South America, caught fire, and after several explosions had occurred, sank in 25 feet of water. Prompt action in cutting the lighter adrift from the steamer resulted in confining the fire to the lighter, as otherwise it would have spread to the steamer and possibly to others.

Oshawa:—It is understood from a statement made by the Hon. Dr. J. H King, that the plans drawn up during the Borden administration for a $500,000 harbor, will be carried out by the new Government. It is said that the new harbor will be one of the first works undertaken by the Department of Public Works. The harbor will be capable of accommodating all ships that use the Great Lakes below Welland.

Montreal:—As a result of a collision between the French steamer "Indo China" and the British steamer "Sarmatia" opposite Three Rivers, both steamers are ashore on the south side of the St. Lawrence. The "Sarmatia" was in ballast, bound for Sydney for coal, while the "Indo China" was bound up for Montreal. The smoke from the pulp mills at Three Rivers is held responsible for the collision according to reports received here.

Montreal:—Sanction for the expenditure of $4,500,000 was received from Hon. Ernest La Pointe for harbor improvements, by the Montreal Harbor Commissioners recently. The plans include a new grain elevator, having an initial capacity of 2,000,000 bushels, to be ultimately increased to 8,000,000 bushels; preparations of designs for the bridge across the harbor; extension of the high level quay walls; extension of wharves and piers; improvement of channel approaches and paving and extension of the harbor terminals.

Detroit:—The executive board of the Seamen's Union decided in a meeting at Cleveland to refer the matter of the Lake Carriers Association's offer of an increase to the men themselves. The Carriers offered to increase the wages of all men below the grade of licensed officers $15 per month, from Sept. 1st. The sailors want an increase in wages and an eight hours day. The men voted to strike once already, but the strike was averted through the intervention of the United States Board of Labor. Ballots for voting will be distributed among all the men on board ships again.

Sarnia:—A curious point has arisen in connection with the explosion of the boiler of the ferry "Omar D. Conger" some months ago. William Smith has a suit of $2,500 against the owners for loss of furniture and household goods caused by part of the boiler demolishing the house he lived in. It is legally uncertain whether the accident can be classed as a marine disaster or otherwise. If not Mr. Smith cannot claim against the owners but only against the vessel, according to a peculiarity in the law.

St. Catharines:—Work on the new Welland ship canal is now in full swing and will so continue until late in the autumn, according to Chief Engineer A. Grant. It is planned to lay 2,000 cubic yards of concrete daily at lock 6, while three steel towers will be put in operation on the concrete work. The Canadian Dredging Co. has four dredges at work on section 5, and 250 men are employed. Porter Bros. have 1,000 men at work, and altogether with the men employed by the Peter Lyall Co. there are about 1,800 men on the job.

Montreal:—After four months of negotiations the Ship Laborers Union have agreed to accept the reduced scale of wages offered by the companies in April last. Under this schedule the men will receive 50 cents an hour for day work and 60 cents an hour for night work, this rate being five cents per hour less than the scale recommended by the board appointed under the Industrial Disputes Act.

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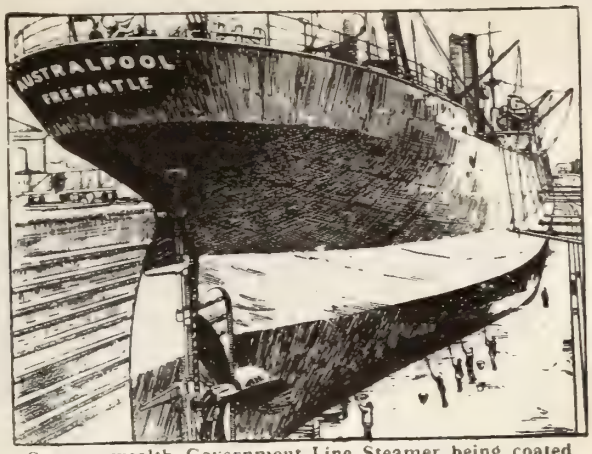

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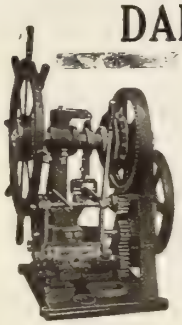

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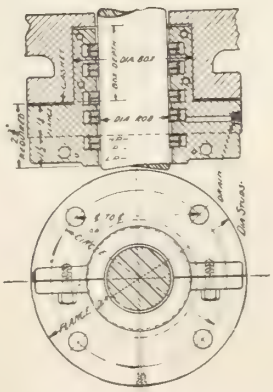

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Holders of the maturing bonds who wish to avail themselves of this conversion privilege should take their bonds AS EARLY AS POSSIBLE, BUT NOT LATER THAN SEPTEMBER 30th, to a Branch of any Chartered Bank in Canada and receive in exchange an official receipt for the bonds surrendered, containing an undertaking to deliver the corresponding bonds of the new issue.

Holders of maturing fully registered bonds, interest payable by cheque from Ottawa, will receive their December 1 interest cheque as usual. Holders of coupon bonds will detach and retain the last unmatured coupon before surrendering the bond itself for conversion purposes.

The surrendered bonds will be forwarded by banks to the Minister of Finance at Ottawa, where they will be exchanged for bonds of the new issue, in fully registered, or coupon registered or coupon bearer form carrying interest payable 1st May and 1st November of each year of the duration of the loan, the first interest payment accruing and payable 1st May, 1923. Bonds of the new issue will be sent to the banks for delivery immediately after the receipt of the surrendered bonds.

The bonds of the maturing issue which are not converted under this proposal will be paid off in cash on the 1st December, 1922.

W. S. FIELDING,
Minister of Finance.

Dated at Ottawa, 8th August, 1922.

CANADIAN SHIPPING and MARINE ENGINEERING NEWS

A monthly review of shipping and maritime matters in Canada and abroad. Published by The MacLean Publishing Company, Limited.

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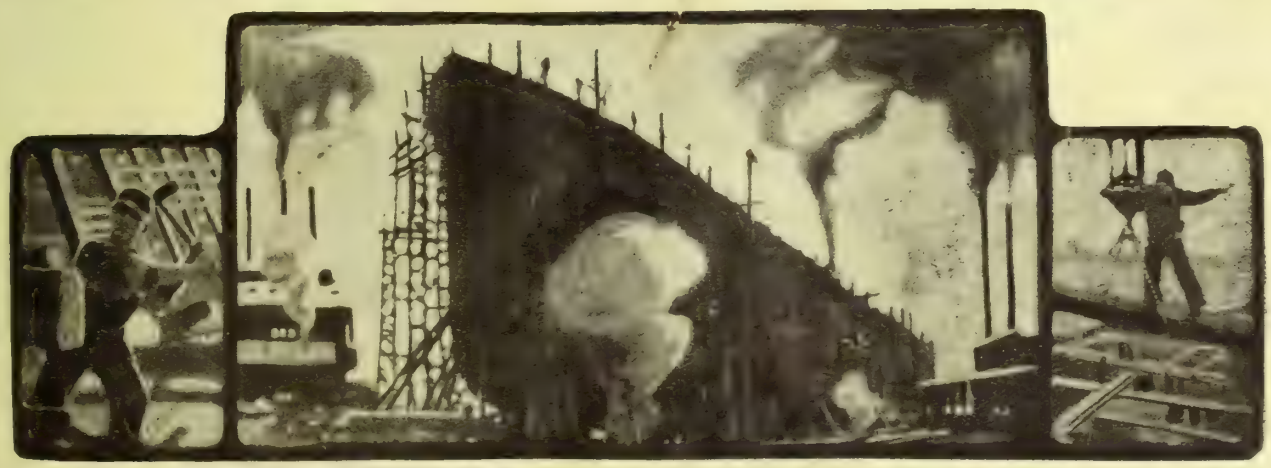

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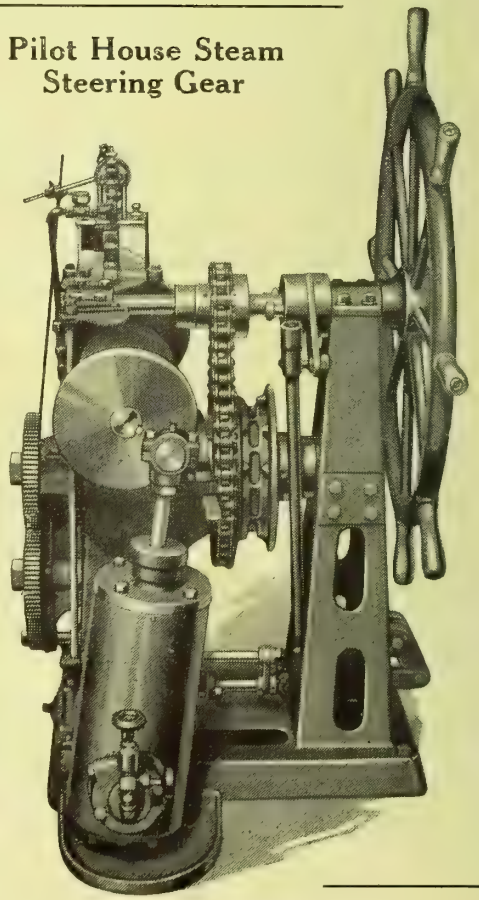

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CANADIAN SHIPPING and MARINE ENGINEERING NEWS

A monthly review of shipping and maritime matters in Canada and abroad. Published by The MacLean Publishing Company, Limited.

News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

THE OCEAN passenger traffic of the St. Lawrence has been comparatively light this season of navigation in comparison with previous years. This phase of the passenger business in particular has reference to immigration. The arrival and landing at Quebec this summer of immigrants from the British Isles and other European countries for inspection, has been very small, on account of Canadian Government restrictions, as well as the high cost charged for steamship accommodation, and although no outward complaint is heard from steamship companies, it is judged that they have not been making money. The new mono-type steamers plying between Liverpool, Quebec and Montreal, which carry cabin and third-class passengers only, have come to be very profitable boats. The three Canadian Pacific steamers, the "Empress of Scotland," "France" and "Britain" who make the ports of Quebec their terminus are the most popular vessels engaged in the St. Lawrence passenger trade. These splendid large steamships have done a fair business this season, and attract the patronage of the wealthy and most distinguished Canadians as well as European branches. The Empress of Scotland which arrived from Hamburg, Cherbourg, and Southampton on its last trip, September 14th, brought the largest number of pasengers in all classes, 1321, since pre-war days. A feature of the St. Lawrence passenger trade this season of navigation is the number of Americans carried in the first class, and if it were not for this new class of travel, the ocean passenger service of the St. Lawrence this season would be indeed small. The "Empress of Scotland" on her last trip brought to Quebec 347 returned Americans who have been abroad seeing Europe, and who principally reside in the midde and Western United States as far as Omaha and California. Seeking the causes for the large number of travellers using the St. Lawrence route in preference to the steamships sailing from the United States Atlantic ports, your Quebec correspondent has been told by American travellers that they choose the St. Lawrence route for several reasons, namely: the excellent accommodation and splendid service of the steamships, and up-to-date railway connections, perfect organization, and the short time out of sight of land, not three days, in comparison to the steamship service from United States ports. It is estimated that approximately ten thousand Americans who have been over to Europe this summer from the begining of June last, have used the St. Lawrence route steamers, and their appreciation is so prominent in every respect that there is every reason to believe that this American travel by the St. Lawrence route will go on increasing every year.

The "Empress of India," formerly the German steamer "Prince Frederick Wilhelm," which has been plying between Liverpool and Quebec in the passenger line, made its last trip from Quebec during the end of the first week in September. The "India" sailed direct to Glasgow and will be handed over to the British Government to perform the duties of a troop transport, and carry troops to India. The "Empress of Scotland" will make her last trip from Quebec September 19th, for the other side to lay up and undergo overhauling for her prospective winter cruises, and it is said that the "Empress of France" is making her last trip of the season to Quebec as she will also follow the "Scotland" for overhauling and make ready for her winter cruises. In the meantime the "Empress of Britain" instead of sailing from Quebec to Liverpool, will take the place of the "Scotland" in the route between Quebec and Hamburg, via Southampton and Cherbourg.

The Canadian Pacific steamer "Montcalm" arrived from Liverpool on Friday morning, September 15th, with 1,059 passengers, including 527 cabin and 532 third class. In the former class were over 200 returned American tourists and on the same date the Canadian Pacific steamer "Metagama" from Glasgow arrived with 997 passengers, 486 in the cabin, out of which 287 were returned Americans, with the third-class accommodation numbering 511. It would appear from these figures that Canada through the gateway of Quebec was receiving a considerable number of settlers. This is not, however, the case, as 90 per cent. of the passengers arriving by the incoming vessels are returned American and Canadian tourists, while 30 per cent. of the passengers in the third-class accommodation are returned Canadians and the passengers designated as new settlers are in the majority people coming out to join relatives at points previously settled in Ontario and the Western provinces.

Ocean Freighters

Though not by any means as large as the previous years, there has been a decided improvement in the ocean freight carrying trade this summer, in comparison with the shipping season of 1921. This applies to the shipment of lumber, and judging from the information gained from the export firms the lumber shipped from this port is over 75 per cent. better than it was last year. But it is only in the lumber this improvement can be vouched for. Apart from this class of shipments the ocean freight export trade at the Port of Quebec was very small. The fault has been in the fact that the Port of Quebec is not equipped with a cold storage plant, notwithstanding the fact that the district of Quebec, including the Lake St. John, Saguenay and South Shore County from the Port of Quebec to Gaspe is a large and important farm producing country, which with its dairy organization, manufactures over 10,000 tons of butter, cheese, etc., for export, generally shipped to European markets through the Port of Montreal.

There is no gainsaying the fact that the Port of Quebec will never come into

its own until it can obtain a fair share of the grain trade shipments through its splendid up-to-date elevators. Not one bucket of cereals have been placed in those elevators this season for export while the Port of Montreal has shipped more grain through its elevators this summer than was shipped during a corresponding period last year. During the season of navigation of 1921 Montreal shippers exported 135,000,000 bushels of grain and expect to ship 150,000,000 bushels. It makes no difference whether or not the Port of Montreal is congested, the influence of the grain dealers in Montreal is so great that the congested conditions are hidden and the Quebec elevators get no grain for shipment. It must be admitted, however, that the fault lies largely with the Quebec business interests, who do not go after the grain trade with the result that what the Port of Montreal is unable to handle is shipped through American ports. Your correspondent with a view to disclosing the real reasons why the Port of Quebec failed to obtain a fair share of this shipment of grain through its elevators, proceeded in the middle of September to investigate. After making inquiries from leading ship agents, and taking personal observations, he found the Port of Montreal congested and over twenty lake boats waiting to get under the elevators to unload their cargoes of grain.

In possession of this certain information he says that he had interviews with several large Montreal grain shippers and agents for steamship interests and was informed by them that the reason why the Port of Quebec did not obtain a share of the shipment of export grain was because they did not have grain agents at the Port of Quebec and did not go after the business. They explained among other things that the brokerages who bought and routed the grain were centred in New York, Chicago and Winnipeg, and the Montreal interests always kept in close touch with them, and if the Quebec business men were to appoint a grain expert or a committee to go and have a heart to heart talk with these brokers and point out to them the advantages the Port of Quebec affords, they would without a question of doubt succeed in obtaining a portion of the grain which was now being routed over American railways for shipment through American ports.

Grain Mixing

The mixing of Canadian grain with American inferior grain was also discussed and the complaint of the London Com. Exchange in this regard was also discussed. Your correspondent was informed that this was no unusual thing. One of the leading grain shippers in Montreal said that when the Canadian grain reached the Buffalo elevators it lost its identity and that Hon. Mr. Robb, Minister of Trade and Commerce was aware of this fact from information he had received and must recognize that this mixing of pure and unadulterated Canadian grain with inferior American grain is a very serious matter for government consideration, and sufficient for insistence that all Canadian grain should be shipped over Canadian railways and with routes for export through Canadian ports. The Quebec shipping interests entertain a firm belief that the Port of Quebec will not receive its fair share in the export of Canadian grain until the Transcontinental Railway is operated for the purpose for which it was built, the shipping of grain from the Canadian West for export through the ports of Montreal and Quebec, during the summer season of navigation and the ports of St. John, N. B., and Halifax, N.S., during the winter months. Ever since the completion of the Transcontinental Railway it has not been given justice in its operation. The managing operators have studiously restricted its possibilities and until a new management undertake its operation to operate the same in accordance with its possibilities the boats transported between the East and the West will be in the power of the ring of speculation. The distance between Winnipeg and Quebec is 214 miles shorter than by any of the other Canadian railroads, and besides its grade offers advantages and the deep water ports of Canada would be equipped to better advantage to the import and export trade than the United States.

Steamship Disasters

There have been more disasters to shipping in the St. Lawrence this season of navigation than have occurred for some years past and experienced river men say that the government would but be performing its duty if it conducted a complete investigation into the physical conditions of the Montreal and Quebec pilotage service. These services are two separate organizations. They are closed corporations and governed by rules and regulations which make them independent. No apprentices can enter the service without the consent of either body. With the result that only sons of the present pilots get a chance.

It was discovered in the past by investigations into wrecks that quite a number of the men engaged in the pilot service were color blind, and owing to the nature of the wrecks which have occurred during the present season, it would be well if the government ordered all pilots to submit to expert medical examination to discover if there were any pilots of the present day suffering from defective eyesight.

The freight steamers "Sarmatia" and "Indo-China" which suffered damage by collision in July at Three Rivers, have been repaired at the Quebec Government dry dock by the Davie Shipbuilding Co. and have returned to service. The freight steamer "Baluchistan" which went ashore off White Island with a cargo of grain and was later refloated by the Quebec Salvage and Wrecking Company is now lying at the Quebec grain elevator where she is having a portion of grain discharged and will soon go into the dry dock for repairs. The "Baluchistan" was badly damaged by her contact with the rocks. Her bottom was completely ripped under No. 1 and 2 holds and her engine also damaged. The grain in the two forward holds was completely damaged and since sold for cattle feeding.

H.M.S. "Raleigh" which was wrecked in the vicinity of Point d'Amour is a total loss. The true story of the cause that led to the loss of this valuable British war cruiser has not as yet been fully recorded for the reason that the British Admiralty never make public any disaster that has happened to ships of war. The true facts in connection with the stranding of the Raleigh can be told in a few words. She was on her way through the Straits in violent weather and the Straits covered with ice and when nearing the Point d'Amour going at high speed met an iceberg, and while steering clear of the iceberg ran on the rocks. Her bottom was torn open from stem to stern with the impact as the ship passed over the jagged rocks, and within a very short time she commenced to sink until she lay with her stern fully imbedded in the rocks with her holds and quarters full of water. Since then the water and floating ice which fills the Straits have played over her decks, and the weather has been so bad that it was physically impossible to attempt to salvage the ship.

Montreal Channel

The water in the channel between Quebec and Montreal got quite low at tidal mark at Three Rivers during the month of September and since then some of the larger class of steamers using the narrow dredged channel in the Lake St. Peter have had narrow escapes from being stuck in the mud. The bottom of this lake is practically all soft slimey mud and some of the larger steamships have touched and gone through this mud. Steamship captains who are called upon to navigate their ships to the Port of Montreal do not hesitate to express in confidence the difficulty they have in navigating their valuable vessels past the Port of Quebec. They say they are always apprehensive of touching and some day this will happen to cause a scare and forbid all big steamships in the St. Lawrence from passing the Port of Quebec.

APPOINTMENTS TO C. G. M. M.

We have received from the office of the superintendent engineer, C. G. M. M., the following list of recent appointments to the engine room staffs:

J. Hoey to be chief engineer of S. S. "Sheba."

J. Still to be chief engineer of S. S. "Canadian Aviator."

J. J. R. Pringle to be chief engineer of S. S. "Canadian Constructor."

F. C. Brown to be chief engineer of S. S. "Canadian Commander."

S. Evans to be chief engineer of S. S. "Canadian Navigator."

St. John, N. B.

THAT this summer has been a record one for the Port of St. John can be verified from previous records published, and it is with a great deal of satisfaction that the period Aug. 12 to Sept. 12, has upheld the record already set.

The following is a list of steamers in port during the above period:

Lexington loaded sugar for Glasgow.

Eastern King loaded sugar for Hull.

Bremerton loaded sugar for Bergen, Norway.

West Noska loaded sugar.

Eastern Pilot loaded sugar.

Grau discharged sugar from Cuba.

H. W. Waage discharged sugar from Cuba.

Mattawa discharged sugar and 100 pun. rum.

Silverway loaded lumber for U. K. port.

River Taft and Tempest discharged cargo of coal from Cardiff.

Asborg loaded cargo of lumber for U. K.

The S. S. Edward Jerames, Hallsjord, Sydfold, called for bunkers.

Solana from Tampico with 38,000 bbls. oil, for the local oil tanks.

The Bryssel is loading a cargo of potatoes for Cuba. This is the first potato cargo this season and it is expected to be followed by a weekly service of chartered steamers.

It is is also understood the Canadian Government Merchant Marine intend to run a service to Cuba this winter, this together with the C. P. R. service and chartered steamers should insure the best possible passenger and freight service to Havana.

* * * *

That the St. John customs receipts for this year will greatly exceed those of 1921 is borne out each month. The month of August showed an increase of $245,518.86 over the like period in 1921. The figures for the two periods follow:

August, 1922: Customs import duty, $733,290.97; Sundries, $307.04; Excise tax, $75,277.49; Excise duty, $4,869.40; Pilotage dues, $2,395; Marine dues, $353.74; Steamship inspection dues, $50; total, $816,543.64.

August, 1921: Customs import duty, $518,810.11; Sundries, $421.59; Excise tax, $43,846.53; Excise duty, $5,141.33; Pilotage dues, $2,329; Marine dues, $186.22; Steamship inspection dues, $290; Total, $571,024.78.

The large increases this year are easily accounted for, as the sugar imports have been tremendous compared with other years. This year, as never before in the summer season, has the harbor been filled with vessels awaiting the refinery berth to discharge and load sugar.

Harbor receipts: An increase of a little over $500 is reported in the harbor receipts for the month of August this year, as compared with last year, the figures being: 1922, $5,058.65; 1921, $4,482.70.

* * * *

The three-masted St. John schooner, Ada A. McIntyre, 423 tons, which is on the Meteghan Marine Railway, Shipbuilding Co. slip at Meteghan undergoing extensive repairs will be floated soon. The damage sustained to the vessel was far more extensive than anticipated, and the repairs included a complete new keel and bottom, stern post and large part of the stern.

* * * *

Sydney, N. S., Sept. 6.—After penetrating into the frozen Arctic along the Western coast of Baffin's Land to a point, he says, never before reached by a white man, Donald B. MacMillan, Arctic explorer, reached Sydney this morning on the schooner Bowdoin, on his return to civilization, after 14 months in the north. Captain MacMillan stated to the Canadian Press, on his arrival, that he had learned that the salient points in and about the Western coast of Baffin's Land are astronomically incorrect.

* * * *

Halifax, N. S., Sept. 4. The three-masted schooner, Maid of Canada, of La Have, N. S., from an American port for Halifax, with five hundred tons of bituminous coal, sank off Halifax Monday morning, after being in a collision with the small steamer, Sadie Mack. Captain Wilkie and his crew of six men were brought to Halifax by the Sadie Mack. The collision occurred during a thick fog.

* * * *

Halifax, Sept. 4. The Gloucester schooner, Corinthian, Capt. Jeffrey Thomas, and the Nova Scotia schooner, Nellie King, Capt. William Murray, were in a collision twice off Halifax harbor Saturday night, the King reported on arrival here. The latter vessel had her chain plates and fore-rigging on the starboard side carried away, her rigging badly smashed and her fore peak halyards parted.

According to the Nellie King the collision occurred in a dense fog. Following the first, the Corinthian put about to ascertain what damage had been done the other vessel, only to hit her again, but lightly. The Corinthian proceeded to the banks. She was en route from Gloucester. The Nellie King, was out from Guysboro, N. S., for Boston with lumber. She will effect repairs here.

* * * *

Yarmouth, N. S., Sept. 4. The Boston three-masted schooner, J. K. Mitchell, Capt. MacLennan, bound from that port to Liverpool, N. S., is on her beam ends in Yarmouth Sound.

The vessel struck Sunday morning on Ganet Southwest Ledges. Later she was refloated and towed to her present position from where it is intended she will be towed into Yarmouth harbor.

* * * *

Lunenburg, N. S., Sept. 11. The schooner Bluenose came off the slip this morning where she has been undergoing overhauling preparatory to the elimination races. Her fore topmast which was taken down after the Bluenose won last year's international race, was replaced and Capt. Walters is now busy putting on the finishing touches. He is making all arrangements for the entry of the Bluenose in both elimination and international events, as the time between the two races is very short and he is confident the Bluenose will be the defender against the challenger.

The elimination contests are to take place off Halifax, probably around Oct. 7th. Eight contestants at least are expected and will include, doubtless, the Bluenose, Mahaska, and Canadia.

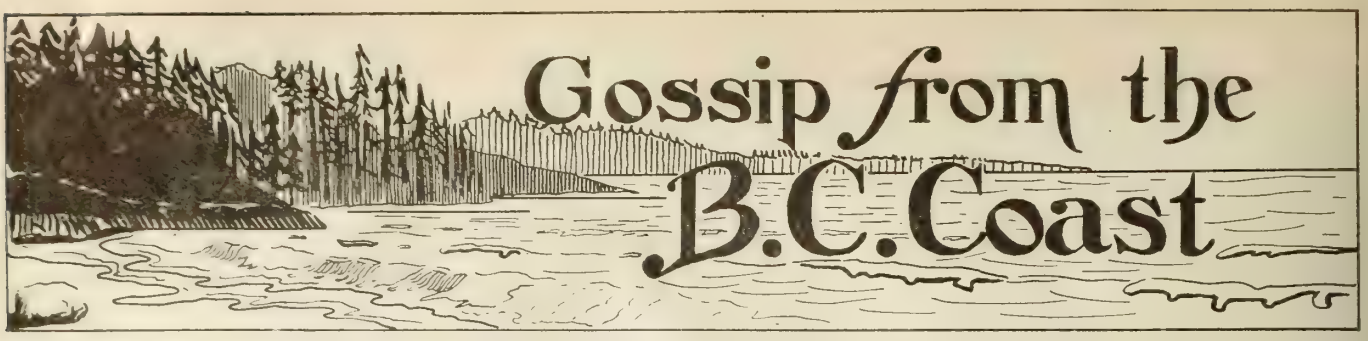
The prize list will be the same as last year. $1,000 for the winner, $700 for second place, $500 for third, $400 each for the next three and $200 each for the next two, a total of $3,800.

The American boat, Mayflower, disqualified from the international fishermen's race last year, because she had not proved her worth as a bona fide fishing boat, has been doing full work of a regular member of the fishing fleet off the Banks, and her catch has been as good as the best crafts of Gloucester. The Mayflower in this manner has now answered her critics and in all probability she will now be a contender in the coming international races.

BRITISH REPRESENTATIVE FOR CANADA

Mr. A. Cameron, representing the firm of John I. Thorneycroft & Co., has arrived in Canada for a tour in which he will investigate the market for his firm's productions. In Vancouver he will probably be joined by another representative of the firm on his way back to England from the Far East. Evidently this famous firm of engineers and shipbuilders are seeking to extend their trade throughout the Empire.

Vancouver, B. C.—Vancouver is beginning to realize that more grain elevators are needed, if the port is to hold the grain export trade secured last year. Between September 1st, 1921, and the present 7,552,044 bushels have been shipped from the port, compared with only 460,000 bushels the previous twelve months. To carry away this amount of grain 80 ships, each taking 3,000 tons, must be employed. The elevator at Vancouver will hold 1,250,000 bushels, 37,500 tons, or roughly 12½ shiploads.



THERE is still no binding agreement between operators setting a definite rate on either trans-Pacific or intercoastal freight, but the tendency is steadily upward and there is now little doubt but that the Pacific charter market has touched bottom and is now heading for a sustained rise.

* * * *

Demand for cargo space on trans-Pacific carriers is still only fair, although a revival of Japanese demand for lumber has strengthened the situation somewhat during the last few days. The railway and coal strikes, the rate wars and other less disturbing factors have been working against the establishment of stable conditions in Pacific shipping, but indications point to a more generally satisfactory situation this fall.

The rate war between companies running ships through the Panama Canal continues. The smaller lines interpret the war as an attempt to force them out of business. They are defying the big operators and propose to fight the war to a finish.

* * * *

The Hudson's Bay Company vessel Lady Kindersley, which left Vancouver last June and is now in the Arctic with supplies for the company's trading posts, may spend the winter in the north owing to the unusually severe weather being experienced there. The ice around Point Barrow did not break until August this year and as the freezing-over commences in late September usually the vessel may not have time to return before winter sets in.

Although there is nothing official to announce about it, reports from several sources state that the principal trans-Pacific operators are getting together with a view to establishing a conference rate on freight. Several companies are already working in unison and have booked lumber to the end of September at $12 a thousand and flour for $5 a ton. The lumber refers to big Japanese squares. Not so very long ago lumber could be shipped across for $8 a thousand, but it would seem that "them days is gone forever." Some Japanese lines profess to be able to operate at $9 and just break even, but most of them are holding their tonnage out of the market until rates on lumber average over $11. There is still a great deal of idle shipping in Japan, but this is due to the dislocation of European trade rather than to inactivity on the Pacific.

* * * *

British Columbia interests are hoping that the recent disclosures of inferior quality of grain passing through United States ports from Canada will lead to a further development of grain elevator facilities at Vancouver and Prince Rupert. Complaints were made to the Federal Department of Trade and Commerce that some of the shipments of grain to the United Kingdom, which was routed through American Atlantic ports, was not up to the required standard and these were referred to Hon. J. A. Robb, Minister of Trade and Commerce, who announced that he would take steps to have a greater percentage of Canadian grain shipped through Canadian ports. It is argued on this coast that the fact that Montreal is closed by ice during the winter, together with the comparative cheapness of shipping west from the prairies instead of east, should influence the government in assisting the development of grain storage and shipping facilities in British Columbia, where the ports are not affected by ice at any season or the year.

* * * *

Victoria business interests are discussing a proposal to ask the Canadian National Railways, operators of the Ogden Point outer docks at Victoria, to take over the ocean piers of R. P. Rithet & Company and consolidate them, so that the Canadian Railway system will be in full control of the port's ocean dock facilities.

Halifax Notes

WITH THE start of the apple export season shipping activities in Halifax have shown a slight improvement during the past few weeks. A number of shipments of apples have been made to the markets of the United Kingdom, but the season is only starting. Last year a record number was exported and the season of 1922-23 is expected to be a good one.

* * * *

Among the steamers which have loaded apples at Halifax this month was the new liner Manchester Regiment, which is one of the finest freighters engaged in the Canadian service. This steamer has just made her maiden voyage to Canada and was greatly admired.

* * * *

The American steamer Bennington, which went ashore on Seal Island last month, has been repaired at the plant of the Halifax Shipyards Ltd., and has resumed her voyage to the Great Lakes.

* * * *

The announcement from Ottawa that the Canadian destroyers Patriot and Patrician would represent Canada at the coming International Schooner Race series off Gloucester next month, has been favorably received. They are the only Canadian naval craft at present in commission, the cruiser Aurora being laid up.

* * * *

The Nova Scotia coast was visited by a severe electrical storm on Saturday, September 16, but no serious damage done. A lighthouse on Devil's Island off Halifax Harbor was struck by lightning.

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With the approach of winter the passenger traffic through Halifax to the West Indies has been improving of late and a steamer leaving this port this month carried quite a number of tourists en route south.

* * * *

The American freighter Lake George, en route from Philadelphia to the Great Lakes, went ashore on Indian Island, off Petite Riviere, N. S., on Sept. 16. She was refloated two days later after some of her cargo had been discharged.

* * * *

The steamer Canadian Voyageur, which went ashore in Bedford Basin last winter during a storm, went in the drydock at Halifax this month to be repaired. The steamer has been laid up here for many months.

The auxiliary schooner Leonor, which was taken as a prize during the war by the Canadian cruiser Rainbow and which ever since has been tied up in Victoria harbour, was sold under the hammer recently to W. R. Drewitt, of Victoria, for $3,650. The vessel was sold to pay the cost of her maintenance while at Victoria, but the price obtained for her only met about half that amount. The vessel will be refitted and probably placed in the Hawaiian fish trade. The Leonor was owned formerly by Radmacher, Muller & Company, of Guayamas, Mexico, but it was suspected that she was being operated by Germans and in June, 1916, she was captured. Mr. Drewitt, purchaser of the Leonor, bought the former quarantine tender Gunhild some time ago.

* * * *

Of the eight or more steamship lines operating fleets regularly between this coast and Europe through the Panama Canal only one provides passenger accommodation, namely, the Royal Mail Steam Packet Company. This company, which has been booking passenger accommodation to the limit, now has strong competition in sight as the East Asiatic Line has entered the field with two motorships, the M. S. Tonking and the Afrika, which are said to be capable of making the passage from Vancouver to Europe in forty-five days. The Tonking was due early in September at Vancouver from London, Hull, Antwerp and Copenhagen. The Afrika was scheduled to reach British Columbia two weeks later. Both vessels are of about 8,500 tons.

* * * *

Japanese buyers have returned to the British Columbia lumber market after a slack period of several months, but as they are still buying only at rock-bottom prices, mill operators have been showing little interest and trans-Pacific shipments have not begun to increase as a result of the new movement. It is expected, however, that lumber will go across to Japan in large volume later in the year.

* * * *

The Canadian Pacific Railway is considering the advisability of placing a ferry steamer in service between Victoria and Port Angeles to carry motor tourist traffic from Washington State to Vancouver Island.

* * * *

Trade between Puget Sound and British Columbia ports and northern Europe is rapidly climbing, and it is estimated that during the next two months thirty-four big ocean cargo-carriers, including both steamships and motorships, will sail from North Pacific ports for northern Europe. General merchandise and lumber are the principal commodities to be shipped, and heavy cargoes are assured for every ship so far booked.

* * * *

The Pacific Salvage Company, of Victoria, has added to its floating equipment through the purchase of the steamer Leebro from the Crescent Shipping Company for use in coastwise salvage operations. For many years the Leebro was chartered by the Dominion Government and used as a lighthouse tender on the British Columbia coast. She is a wooden vessel and was built in Victoria in 1908 by William Turpel & Sons. She has been equipped with powerful pumps and salvage gear and, with the steamer Algerine, operated by the Pacific Salvage Company in ocean work, comprises the most complete salvage fleet on the Pacific coast.

* * * *

Eng. Lieut-Commander George L. Stephens is reported as the successor to Eng. Commander Clark, who will shortly relinquish command of the Esquimalt dockyard and go to Halifax, where he will be transferred to the Canadian destroyer Patriot. The Royal Naval College, which has been maintained at Esquimalt ever since the college at Halifax was destroyed by fire, has been closed permanently. Eng.-Commander Jefferson, who was formerly in charge, has gone to Halifax to bring the destroyer Patrician to this coast. It is expected that the Patrician will take her place at Esquimalt as part of the training flotilla about December 15.

* * * *

Instead of curtailing its service between British Columbia and California, as was reported in some quarters, the Canadian Government Merchant Marine will place additional tonnage on that route. It was announced here recently that vessels of 4,400 tons will shortly take the place of the three 3,900-ton vessels being operated, and that the smaller vessels will probably be sold as soon as they are relieved by the new steamships, which will be diverted from the Atlantic. The Canadian Rover, Canadian Observer and Canadian Farmer are now handling the California business and the main item of freight is pulp and paper, the government fleet having a four-year contract with some of the largest mills in British Columbia.

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Allan Cameron, formerly of the New York office of the Canadian Pacific Railway and at one time an official of the company's Victoria office, has been appointed to take charge of the company's business in the Far East, with headquarters at Hongkong.

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The Nippon Yusen Kaisha, Japanese shipping company, has purchased two more Clyde-built steamships of 5,500 tons, but they probably will not be placed in the trans-Pacific service. The Nagasaki Maru and Shanghai Maru are the names of the two new vessels, and they will be engaged in the Shanghai-Nagasaki run as soon as they reach Japan.

The first new French steamship to visit the Pacific coast since the war is the freighter Alaska, which reached San Francisco late in August. She is a vessel of 12,000 tons deadweight and is designed especially to meet the requirements of the trade between northern and western Europe and the Pacific coast. The Zenon is a sister ship and she will be assigned shortly to the same route. The advent of these two steamships demonstrates the determination of French shipping interests to enter the international competition for the business passing through the Panama Canal.

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According to advices from Japan, the masters of all steamships being operated by the Nippon Yusen Kaisha have been instructed to maintain reduced speed in order to conserve fuel.

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The Admiral Line steamship H. F. Alexander, formerly the Great Northern, operating between California and Puget Sound ports, is now ready to resume sailings following repairs of damage done when she grounded at Cake Rock, a few days ago. The steamer is being equipped with a Sperry gyro compass and a radio direction finder with a view to avoiding similar accidents in the future.

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Capt. E. P. Bartlett, who was in command of the Admiral Line steamship H. F. Alexander, when she went aground at Cake Rock recently, was found guilty of negligence by the Seattle Steamship Inspection Board, and his master's license has been suspended for four months. Capt. Bartlett has appealed from the ruling to Capt. William Fisher, chief inspector at Seattle.

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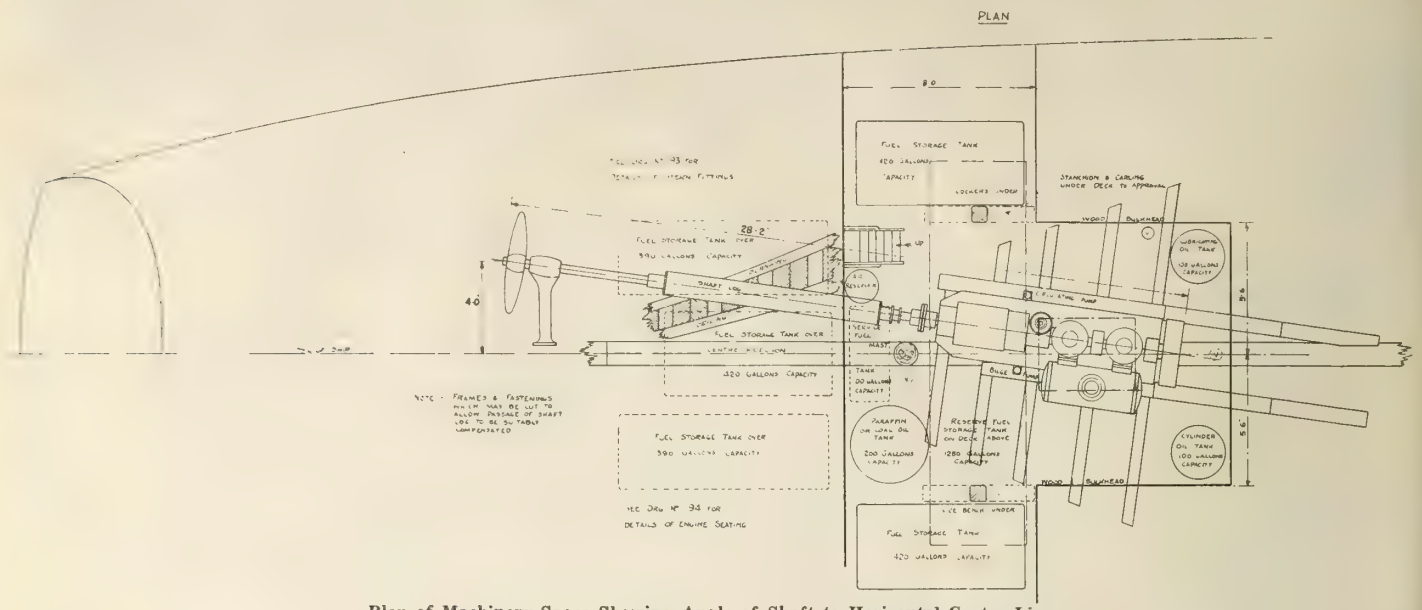
Norman A. Yarrow, managing director of the firm of Yarrows Ltd., Equimalt shipbuilders, has returned from Great Britain, where he visited his father and inspected the yards of the parent firm of Yarrows on the Clyde. He states that shipbuilding to-day is the "deadest" industry in the United Kingdom, with 60 per cent. of its workers idle.

Montreal.—Messrs. Jones & Glassco, Montreal and Toronto, have recently accepted the Canadian agency for the Unchokeable Pump, Limited, of London, England. This pump is a specially designed unit of the centrifugal type and it is guaranteed to pump with its patent impeller the following materials, when they are mixed with a nominal quantity of water—fibre, grit, tailings, flushings, ashes, sand, tan, sewage, grain, mud and pulp. The design of the pump is such that it depends on nothing but the impeller to deal with the solids and the pump will swallow anything capable of passing through the suction opening. The pumps are standardized and absolutely interchangeable. It is stated that the pump has successfully demonstrated its ability to handle solids of a coarse and bulky nature in a manner that has never been done before by a pump.

A Novel Auxiliary Installation



Plan of Machinery Space Showing Angle of Shaft to Horizontal Centre Line

AN installation of some interest has recently been carried out in the three masted schooner "Albert Revillon," owned by the Revillon Freres Trading Co., Ltd.

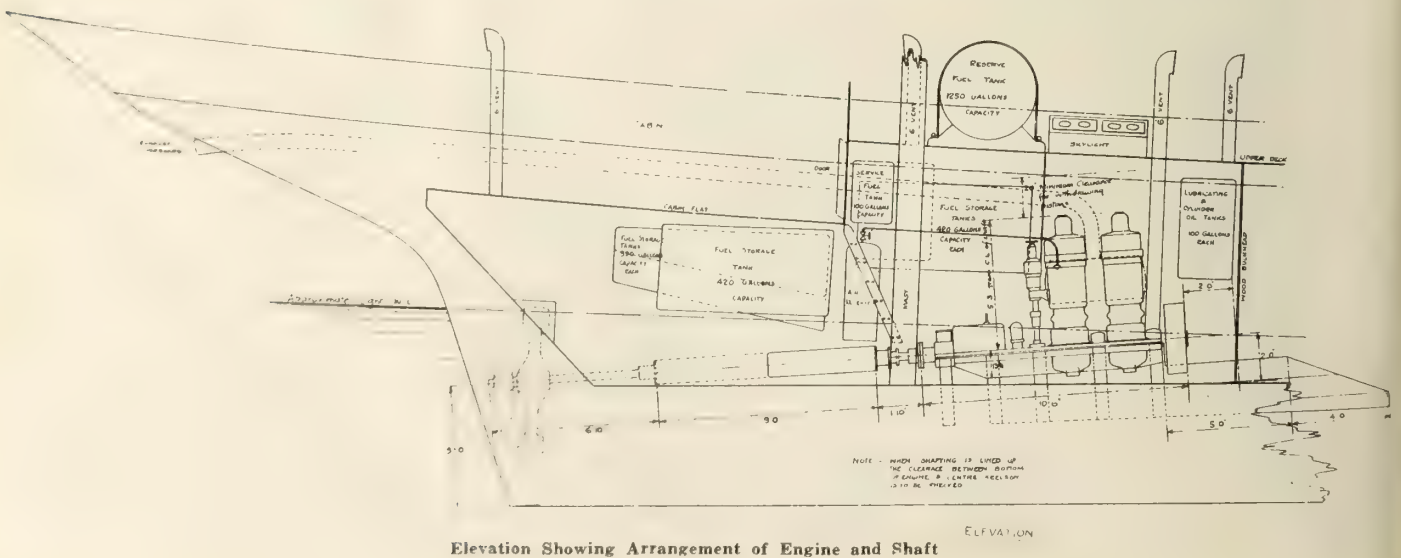
This vessel was purchased in the spring for the purpose of conveying supplies to the company's various posts in the Hudson's Bay and Labrador. The period of open navigation in these parts being short, and winds fickle, a reliable auxiliary engine capable of giving the vessel a speed of at least 7 miles was necessary, and after some investigation it was decided to install a two-cylinder 90/100 B. H. P. reversing gear model "Densil" crude oil engine, which engine is made in Denmark and marketed in Canada by The Crude Oil Engine Co. of Canada, of which company Mr. Walter Lambert, the Montreal naval architect, is principal.

This engine operates on the well-known semi-Diesel or hot bulb principle, it being necessary to preheat a portion of the cylinder by a blow lamp for a few minutes. The initial impulse is given by compressed air, which is generated by the engine and stored in a small tank, after which the oil ignites without assistance by reason of the heat generated by compression in the cylinders.

This particular installation is somewhat out of the ordinary inasmuch as in order not to disturb the existing deadwood, sternpost and rudder, the shafting is led out at the side, so that the propeller is placed in about the same position as in the case of a twin screw installation, while the engine is about on the centre keelson, the shafting being given a horizontal as well as a vertical rake to suit it. At first sight it would seem that this transmission alignment would give a permanent turning moment, but as a matter of fact the vessel carries no helm whatsoever when going straight ahead.

Owing to owners' anxiety to place vessel in service with the minimum of delay, no formal trials were held, in fact the work was completed one day and a dock trial run, and vessel proceeded to sea the following morning at 6 a.m. We are advised, however, that a speed of 7½ knots was attained with a cargo of 300 tons aboard, while the fuel consumption was 6½ gallons per hour, at a cost of 12 cents per gallon, which amply demonstrates that this type of engine is about the most economical marine prime mover obtainable for small vessels.

Its simplicity of operation is perhaps most strikingly evidenced by the fact that the vessel has left on a three months' trip with the engine in charge of a colored man, who has had no previous experience of the Densil engine.



Elevation Showing Arrangement of Engine and Shaft

American Association of Port Authorities

During the week of Sept. 11th, the annual convention of the above body was held in the city of Toronto, delegates from practically every ocean and inland port in the United States being present. In addition, Canadian representatives were also present, and one delegate from London, Eng.

The convention lasted from Sept. 14 to 16th, and considerable business was done, besides a certain amount of time devoted to social activities. Addresses on various subjects connected with the facilities of the different ports, as well as the problems furnished by the use of oil fuel in harbors, were delivered and debated. A great deal of attention was paid by a number of the speakers to the St. Lawrence deep waterway scheme, there being a sharp division of opinion on the subject. In general, it might be said that the delegates from the eastern ports were against, and those from the inland ports of the west were in favor of the scheme.

Canada was honored when the election of officers of the association for the ensuing year took place. Mr. M. P. Fennell, general manager of the port of Montreal, was elected president of the association, while E. L. Cousins, manager of the Toronto Harbour Commission, was elected third vice-president. Mr. Fennell has been secretary of the association for the past four years and his promotion was well earned. The following is the complete list of officers elected.

New Officers

President, M. P. Fennell, jun., general manager of the Port of Montreal; first vice-president, B. F. Cressam, chief engineer, New York Authority third vice-president, B. F. Cressman, chief engineer, New York Authority; third vice-president, E. L. Cousins, general manager, Toronto Harbor Commission; secretary, T. S. McChesney, assistant general manager, Port of New Orleans; treasurer, F. C. Marron, assistant secretary, Port of Seattle.

Directors — Major-Gen. Lansing H. Beach, Washington, Chief of Engineers, United States army; A. G. King, Director, Port of Norfolk, Va.; H. G. Hegardt, Chief Engineer, Port of Portland, Ore.; Brig.-Gen. Thomas Tremblay, Commissioner, Port of Quebec; B. C. Allin, Director, Port of Houston, Texas; Charles W. Francis, Commissioner of Public Works, Chicago; Major C. T. Leeds, Consulting Engineer, Port of Los Angeles.

Executive Committee—Hon. J. S. Cole, President, Boston Authority; Benjamin Thompson, Consulting Engineer, Tampa, Fla.; John H. McCallum, President, San Francisco Harbor Commission.

A number of interesting papers dealing with harbor problems were read, and some of these are reproduced in another part of this issue.

"CANADIAN TROOPER" GETS $25,000 SALVAGE

In the Admiralty Court at Montreal, on Sept. 7th, Mr. Justice Maclennan paid a graceful tribute to the skill and courage displayed by the master and officers of the "Canadian Trooper" in salvaging the Norwegian steamer "Otta." The "Otta" broke her rudder stock last October when 600 miles off the Newfoundland coast, outward bound with a cargo of grain from Montreal. The steamer was in grave danger and sent out a wireless call for help, to which the "Canadian Trooper" responded. The "Trooper" took the Otta in tow and for ten days in spite of stormy weather and high seas stuck to the job and finally was able to get the ship to St. John's.

The owners of the Norwegian boat offered to pay $12,500 for the salvage operations. The C. G. M. M. considered the amount too small and a settlement had to be effected in the courts with the result after careful analysis of all the facts the "Canadian Trooper" was awarded $25,000 salvage remuneration. This money is to be apportioned as follows:

Owners	$17,000
Master	1,500
First officer	700
Second officer	500
Chief engineer	800
Second engineer	500
Wireless operator	500
To be divided among other officers and crew	3,500

Captain J. O. Grey sat with Mr. Justice Maclennan in the case, in the capacity of nautical assessor.

THE INSTITUTE OF CHARTERED SHIPBROKERS

Incorporated by Royal Charter 21st January, 1920

The business of a shipbroker has been described as the nursery of the shipowner, and it is found that the majority of shipowners began their careers as shipbrokers. The latest report of the Institute of Chartered Shipbrokers of the United Kingdom, which has a membership of upwards of 2,300, is very interesting. The objects of the Institute are to raise the status of a shipbroker by examination and by lectures, and to protect and promote the interests of the business of a shipbroker in the United Kingdom. Rules are in force to ensure that a chartered shipbroker shall carry out his duties in an efficient manner, thereby gaining the confidence of the shipowner employing him, for the owner, successfully to manage his steamers, depends to a very great extent upon the ability and integrity of the chartered shipbroker, who can advise him of the various changes in the freight markets and, by his experience secure the best possible dispatch of the steamers at the various ports where the shipowner has to rely entirely upon the shipbroker.

To ensure that the chartered shipbroker shall receive fair and reasonable remuneration for his services the Council of the Institute has drawn up a Scale of Agency Fees. This scale has been approved by the Chamber of Shipping of the United Kingdom, a body consisting of the shipowners in the United Kingdom who are the largest payers of agency charges to British shipbrokers. A chartered shipbroker has to rely entirely upon the fees for his remuneration; he is not allowed to receive any allowances from tug owners, stevedores and the like, and if there are any rebates or discounts these must be credited to the shipowners. A member of the Institute is liable to expulsion if he acts dishonourably by retaining rebates or discounts. It is important to bear in mind that chartered shipbrokers are subject to discipline. In the event of a shipowner being dissatisfied with the chartered shipbroker he can place his complaint before the Council of the institute, who will examine and report if the complaint is justified, and, if necessary, deal with the chartered shipbroker. A foreign shipowner may, therefore, be quite certain if he entrusts his business to a chartered shipbroker in the United Kingdom that his interests will receive proper attention. It may, in conclusion, be mentioned that the important body known as The Baltic and White Sea Conference, at one of their recent meetings, recommended the members to employ only chartered shipbrokers.

BOOK REVIEW

We have received from the Liverpool Journal of Commerce four little volumes, devoted respectively to the shipping interests of Liverpool, Glasgow, London and the North-East coast. Each of these books contains a complete directory, and in many cases, financial and historical information of every shipping firm of any importance in the four districts mentioned. A complete list of officers and heads of departments is given, and a list of the ships of each owner, with the services they are engaged in. In addition to this, a list of the docks of each port and their facilities are given, and inside the front and back covers excellent maps of the dock areas are inserted. These maps are folded, and in some cases show in colors the rail connections, etc. Shipping brokers, insurance companies, port authorities, and classification societies are placed at the back of each volume. The books are published at two shillings each, by the Liverpool Journal of Commerce, and they should be on the desk of everyone who is connected in any way with the shipping industry. They are of a very convenient size, and bound in strong paper covers, and their value is far greater than intimated by the very reasonable price at which they are issued.

Freight Handling Machinery and Equipment

By B. F. CRESSON, Jr. *
Before the American Association of Port Authorities

AMONG the important factors that must be considered when freight handling machinery is to be determined on are these:

(1) The Geographical Conditions at the Port

This includes the navigable waterways that may be made navigable, and the relation of these waterways to the waterways and canals leading inland.

(2) The Hinterland of the Port

Under this heading must be considered the raw materials moving out through the port and raw materials moving inland through the port, also the manufacturing areas which consume and produce commodities passing through the port.

(3) The Rail and Water Transportation And Distribution Inland from the Port

This includes the character of railroad service at the port whether it is independent by railroads or whether it is a joint railroad service, and it includes also the character of the rolling stock and the character of the freight handled between rail and ship. In the service inland by water the character of the commodities and the character of the craft navigating the inland waterways is of great importance.

(4) The Established Trades Through The Port

This includes such materials as bulk cargo and it involves the consideration of the regular liner service and the established trade routes. It also includes the consideration of the movement of special commodities in large volume through the port in both directions.

(5) The Types of Ships

This includes the consideration of the requirements of high class passenger liners, of freight ships in foreign trades, of side port ships and of ships built to handle specific commodities, such as ores, coal, oil, grain, etc.

(6) The Control and Operation of Port Facilities

This includes a consideration of private and public ownership of terminal facilities and public and private operation. It includes the consideration of whether the handling of cargo is done by the port authorities, or by the shipping companies, or by control of stevedoring organizations.

(7) The General Trend of Growth of Commerce Passing Through Port

Before discussing these factors, let consider with satisfaction, the freer interchange of ideas and experience that has come about within the last few years between the officials responsible for the development of harbor facilities at the different ports. There is no more useful function for this Association than for it to encourage this thing.

It was comparatively a few years ago that each of our American ports appeared satisfied within itself and with its own knowledge and experience, and the results of this policy can be seen where one port has developed under one theory and another under a different theory.

There is less excuse in North America for differences in fundamental opinions as to what should be provided at ports in the way of facilities, including machinery, than as between ports in this country and ports abroad. A major difference between ports in this country and ports in foreign countries lies in the difference in the railway equipment of the countries.

In American ports the railroads handle their principal business in box cars. In European countries a great preponderance of traffic is handled in open cars, and the difference between handling freight between a ship and a box car with a side door, and an open car which can be loaded and unloaded from the top, is a very substantial one.

It is also a factor of very great importance that a far greater proportion of commerce is handled between ship and river or canal barge in Europe than is handled in our American ports in this manner.

But through the interchange of ideas the rail equipment in different countries is becoming more nearly comparable, and in this country we are beginning to realize to a greater degree the value of inland water transportation, so that the time may be confidently looked forward to when there will not be so great a difference between the operation of loading and unloading ships on the two sides of the ocean. When this time arrives there will be still greater value in co-operative effort between port designers throughout the world.

The same ship that leaves an American port with a cargo docks at a foreign port to discharge her cargo and to reload back to an American port. It is the same ship and it is the same cargo that is operated and handled at both ends of the trip, and yet it is hardly possible to see that there has been any co-operation or co-ordination whatever in the laying out of the facilities at the two ports.

At one port there will be a forest of cranes, and these will be used, and at the other port there will be no cranes whatever and an entirely different operation and form of equipment will be employed.

I make a plea for greater co-operation in the laying out of new ports and new facilities, wherever they may be.

Take our Pacific trade, which is only in its infancy. Why should not the ports on the Pacific and the ports in the Orient be laid out and built along similar lines? There is probably one best layout for rapid and economic handling of cargo, and within a reasonable limit this condition should exist on both ends of the ship's run.

Taking up now in a little more detail the factors to be considered and determined on freight handling machinery, let us consider:

(1) The Geographical Conditions at the Port

There are ports which lie on one side of the entrance channel or river, ports that lie on two sides of the entrance channel, and ports which are split up by waterways into a number of separate parts.

Ports that lie on one or two sides only of a waterway are usually served by direct railroad connection, but in ports separated into several parts by the harbor waters there are almost always certain sections of this port which do not have direct rail service.

In this latter class of ports, it is usually necessary to perform a more or less great amount of harbor lighterage or floatage of cars, and this entails what may generally be considered as an additional handling, either of the freight, or of the railroad cars, and it also makes necessary the provision at the port of facilities to load and unload barges or lighters which usually are without their own freight handling equipment.

So that the geography of the port should be considered, and its relation to the internal movements of freight, when considering what machinery is desirable and justified in the different sections of the port.

(2) The Hinterland of the Port

A distinction must be made between ports whose business may be considered as local within the immediate district surrounding the port, and ports which are merely "through" ports.

At ports which serve the manufacturing districts in the immediate vicinity of the harbor facilities there will be some interchange of freight between the ship and the industries by rail, and there will be a considerable amount of transferring between the ship and the industries by motor truck, and there will also be industries located directly along the water-front. The water-front of these indus-

* [illegible] Port of New York

tries will be used to handle specific and un form commodities to a very large degree, and it will be a simple matter to apply or design efficient freight handling machinery.

At the water-fronts which will serve the districts immediately back or near by, either by railroad car or truck, there will be the necessity for local storage reservoirs connecting with the water-front. At such a point there is likely to be a movement of freight between the private industrial wharfage and the wharfage serving a considerable district by barge or lighter.

Special consideration should be given to the facilities for moving the cargo between the ship and the storage reservoir adjacent to the water-front.

Where, however, the port is largely a "through" port, there is likely to be the movement of a considerable volume of heavy or gross commodities, and there will be the necessity for provision for rapid interchange between railroad car and ship, also storage for the accumulation of cargo and facilities for handling bulk cargo. Such a port may also have a considerable amount of business moving to the interior by canals or internal waterways, and facilities for loading river or canal barges must be provided.

(3) The Rail and Water Transportation and Distribution Inland From the Port

This is one of the most important, if not the most important, considerations in determining on freight handling machinery and one of the reasons for the difference in equipment of American and foreign ports.

So much dependence in Europe is placed on distribution and collection of import and export freight by river barge and so comparatively little in this country. The Rhine and Elbe Rivers, by barges up to 2000 tons capacity, do a large amount of this business, and the railroads' service for this freight is of almost secondary importance—to be called upon in times of high water and ice. The Rhine and Elbe barges are not equipped for self-loading or discharging, but depend on the ship's tackle or on the cranes at the docks.

Where the cargo is "through" cargo and can be handled direct there is a large amount of steam loading of the barges at the ocean ports, but where there is the necessity for an intermediate handling or storage, then cranes must be used, and they are necessary at the ports along the rivers; they are found in great numbers—hydraulic, steam or electric.

The free port or foreign trade zones at foreign river and ocean ports are also an element to encourage freight handling machinery.

Improved inland waterways in the United States and Canada, which are likely to result from present agitation and demand, will justify additional machinery at our river and ocean ports.

Where heavy machinery or drafts of great weight or size are to be handled, floating cranes must be used and every port of importance must have its equipment of heavy floating cranes.

Even where the quay or piers are well served by railroad tracks and freight handling machinery, provision should be made for loading and unloading ships on the offside from barges in order to lessen the time of lay days of the ship in port.

(4) The Established Trades Through the Port

Machinery for bulk cargo in either direction, in large volume and to either rail or water carrier, presents no problem of difficulty to the engineer or the designer of freight handling machinery.

In ports that already have established trade routes, and ports that are seeking such, the question of zoning is a proper one for consideration—zoning either by principal commodities or by principal trade routes.

An examination was made in New York a few years ago by the New York, New Jersey Port & Harbor Development Commission of the character of cargo handled in important trade routes—what, if any, were the principal commodities handled in the China trade, for instance—what were the sizes, dimensions and weights of the containers in which these principal commodities moved and their movement through or into the port district: the purpose of this study is easily recognized in the knowledge it gives as to what terminal arrangements would be most efficient and what machinery should form the equipment.

Zoning by commodities is not unusual, and simplifies the problems of design and layout.

(5) The Types of Ships

The types of ships which trade at a port are also an important factor in determining on the freight handling equipment. No ship is earning anything while it is in port. A ship built for speed, in order to operate economically, must have a quick turnaround at a port in order that its speed may be justified—such a ship costing more per ton to build can less afford avoidable lay days at a port than can a cheaper and slower ship. So, in the case of a ship where a rapid turnaround is all-important, means must be employed for unloading and loading cargo as rapidly as possible in order to clear the ship, and it easily may be economic to handle freight at greater cost per ton in order to handle it more quickly.

On the other hand, in the case of a ship carrying its cargo over a long voyage, of moderate speed, which will receive a comparatively low return per ton for the freight carried, it makes a great deal of difference what it costs to unload and load the cargo. If a ship gets $8.00 per ton for carrying freight between two ports, and it depends on its freights for its profit, it is a matter of great consequence whether it costs $1.00 per ton or 0.75 per ton at each end for handling cargo into and out of the ship.

From the point of view of the ship itself in either case, a considerable amount of freight handling machinery appears to be justified, but from the point of view of the port and the interests controlling and operating the port there may be less enthusiasm in providing the machinery on the docks.

Side-port ships require different dock arrangements than ships with deck hatches—in the former case, especially where there are substantial tidal variations, wharf drops with or without mechanical ramps are highly useful.

(6) The Control and Operation of Port Facilities

Every ship has its own winches and cargo masts and can, usually with a considerable degree of speed and economy, handle its own cargo. The owners of the facilities at the ports, unless they happen to be the owners of the ship—also—which is unusual, may properly hesitate about spending large sums of money for extensive freight handling machinery, unless they are reasonably sure that it will add to the business of the port and that it will not show on the red side of the balance sheet, even when considering the operation of the port or its facilities as a whole.

Freight handling machinery is an excellent advertisement for a port. It appeals strongly to the imagination of the public. A new public harbor administration is likely to frown upon the failure of their predecessors to provide "up-to-date mechanical appliances:" and then there is always the pressure of the manufacturer and the salesman who has freight handling machinery to sell.

On the other hand, there is the picture to present of port facilities with cranes and other mechanical devices to handle freight and to attract new business; on the other hand, there lies the danger of having to pay heavy bills for the installation, maintenance and use of the machinery without sufficient returns to justify it.

It is a very serious question, and no harbor administration is justified in placing orders for elaborate and extensive freight handling equipment until it has looked at the question from every angle.

The writer of this paper is in favor of and believes in freight handling machinery within reasonable limits; and he also believes that in the United States harm has been done to the science of marine freight handling by putting in machinery ill-fitted for the service it was expected to perform, or by putting in an over-supply of machinery that cannot all be needed for service and much of which will lie idle, giving in both cases an unwarranted black eye to cargo-handling machinery.

And then, it must be remembered that customs (not in the sense of tariffs) play an important part in the operation of ports. Where cargo masts on piers and winches and ship's tackle have been used for years, and where a large amount of the stevedoring is by contract, it is unlikely that new methods and new machinery will have a fair show of success at the beginning. Perfectly good machinery has been dumped overboard or

put out of commission by elements of labor who regarded them as devices antagonistic to labor rather than as devices to aid labor.

(7) The General Trend of Growth of Commerce Passing Through the Port

This involves an economic study of conditions within what may be considered the hinterland of the port.

Tariffs of railroad and steamship: the influence of water transportation on railroad rates: the growth of population and industry: the commodities and trade routes best adapted to the port in question and the influence of other nearby ports—what they have created and what their program, if any, is.

Much could be written on this subject, but time prevents.

Conclusion

What has been written above are a few of the major elements of the subject under consideration. There are many others.

Be sure and provide enough machinery and of the right kind and capacity. There is danger in overdoing. Nothing (excepting the right kind of port administration) is of greater importance to a port than the right kind of layout of terminal facilities and equipment.

And, in closing, let me again stress the value of co-operation between nations in the development of ports and harbors—they are their points of contact.

USE OF OIL FUEL HELPS STEAMERS

A special correspondent of Lloyd's List, London, in a recent issue says:

During the past two or three weeks a good deal has been said and written about speed performances by the largest and fastest vessels in the British mercantile marine, and some commentators have gone so far as to say that new Atlantic records have been established. The Cunard liner Berengaria and the White Star liner Olympic have both exceeded their previous best speeds, and have made records of which very few people believed them capable. They were understood to be relatively slow vessels—compared, that is, with the Mauretania—and they and the Cunard liner Aquitania and the White Star liner Majestic were not expected to approach the speed of the famous vessel which still holds the honor of having crossed the Atlantic in the shortest period of time. The use of oil fuel, however, has added a knot or two to the speed of each of the ships named and has, at the same time made them capable of running more regularly and more to an exact time table. The capabilities of the Olympic and the Aquitania were very well known long before they were fitted with oil-burning apparatus. Each was deliberately designed for a speed a few knots less than that of the Mauretania. They were to be equally comfortable and equally popular with all classes of travelers except those to whom a day or less on the cross-Atlantic voyage was a matter of great importance, and they were to carry large quantities of cargo, and thus earn revenue which could not be earned by the record-holding ship. Within the past few months they have proved that they are capable of attaining the pre-war speed of the Mauretania on short runs and even of exceeding it under specially favorable conditions. But it does not by any means follow that the honors of speed on the Atlantic have been wrested from the Mauretania. Less was known about the speed capacities of the Majestic and the Berengaria, because both were ex-German vessels, and it was hinted that their designers and builders really intended them to set up new records, and to win back to Germany the "Blue Riband" of the Atlantic. They were to spring surprises on the world of shipping, by proving much faster than they were supposed to be. So far neither of them has done anything of this kind, but—with the help of oil fuel—they have both attained higher speeds than those for which they were understood to be designed. These higher speeds, however, are quite in accordance with the experience obtained in the large ships built in the United Kingdom. Apart from some short spurts of very high speed, the ex-German vessels have gained, as a result of the use of oil fuel, just about as much as the other Cunard and White Star ships have gained. The Berengaria crossed recently from New York to Cherbourg in 5 days 19 hours 31 minutes, at an average speed, of 23.22 knots, which was only .76 knots under her previous record. On a short run into Cherbourg at the conclusion of the same voyage she steamed at an average speed of 25.18 knots. There are, at the moment, no comparable figures for the Majestic or the Aquitania, although both have come pretty near these, but the Olympic, when crossing from New York to Southampton last week, maintained for several hours a speed of 27.82 knots, which is called "the world's record for merchant vessels." Before admitting this, however, it is necessary to define what is meant by records. It is not quite fair to say that a performance like that of the Olympic means that the Mauretania has been relegated to second place. The latter vessel attained in May, of this year, a short-spell speed of 27.50 knots, and thus set up a record which has evidently now been broken by the Olympic. But it is quite impossible to discriminate between vessels on the basis of short ocean runs, of different lengths and under varying conditions of wind, weather and tides. Such performances are frequently a matter of good luck or a combination of favorable circumstances. The acknowledged speed record is that of the complete cross-Atlantic voyage. In this the Mauretania is still supreme, and is, therefore, the holder of the "Blue Riband." On Monday she completed at Southampton, her fastest post-war voyage an average speed of 25.26 knots. On her immediately preceding voyage the speed was 25.29 knots, and the time was 2 minutes more; while, in June, she crossed at a speed of 25.29 knots on a voyage the length of which was 5 days 8 hours and 14 minutes. The extraordinary feature of these runs is their almost perfect uniformity in time and speed. No other vessel has crossed at this average, or has maintained such remarkable time-table regularity. In both respects the Mauretania easily retains first place. What concerns owners mainly is, of course, the earning capacity of their fleets. In this respect it may be said truly that high speed, taken by itself, does not pay. It pays in a few vessels, on the English Channel-New York route, but even on that route it would not pay in many vessels—at least not until it can be obtained more economically than at present or can be combined more effectively with large cargo-carrying capacity. One of the problems which the naval architect of the near future will have to face is just this—to increase speed without increasing running costs; or to increase earning power so as to counterbalance the high running costs of high speed. The designer who produces a ship with the speed of the Mauretania, the carrying capacity of the Majestic, and the running cost, relative to size, of the pre-war Olympic, will have done much to solve the problem.

MIDLAND BUILDING NEW SHIP

There has recently been ordered from the Midland Shipbuilding Co., a new steamer for the Great Lakes Transportation Co. The new vessel is to be a canal sized steamer of the self unloading type. She is of single deck construction, and will be of the following dimensions:—length 259 feet, breadth, 43 feet, and will carry 2,000 tons on a draft of 14 feet. Her engines are to be of the triple expansion type, the sizes of the cylinders being 17 ins., 25 ins., and 43 ins. diameter with a stroke of 30 inches, and steam will be supplied by two Scotch boilers 12½ feet diameter by 11 feet long. The working pressure will be 185 lbs. per square inch. The unloading gear will consist of two steel belt conveyors, with a capacity of 500 tons per hour. These conveyors will convey the cargo to the forward end of the hold, where it will be dumped into a hopper, from which it will be carried up to a steel boom 75 feet long, carrying a belt conveyor its full length. This boom will be capable of swinging outboard on either side of the ship. The unloading apparatus will be independent of the main engines, and will be operated by motors, the power being furnished by a generating set driven by steam turbines. The vessel will be of steel to the highest requirements of the American Bureau of Shipping for lake service. She will be fitted with double bottoms, and side tanks.

Ships Ports and Commerce

By EUGENIUS H. OUTERBRIDGE *
Before the American Association of Port Authorities

These are the Trinity of business, producing action and reaction.

It would be interesting to try and trace in early world history which of these three was the prime factor, the underlying influence that inspired the development of the other two.

But the world moves too fast for retrospection.

Introspection, to see if we are keeping pace with it, is more essential.

Ships in one form or another have existed since the earliest days of human history. Noah's ark was abroad upon the waters until the dove, like a modern carrier pigeon, brought the signal of a safe port of entry.

Whether it was explorers who first inaugurated trade or trade that drove explorers to seek new fields, ships were the means by which both exploration and commerce were accomplished.

Ships became the commercial missionaries of the world, bringing countries and peoples into knowledge of each other and producing an economic interdependence essential to world prosperity and happiness.

War having dislocated these relations, which in spite of many efforts have not yet been restored, the world is struggling in great distress, and will continue so until a common interchange of the products of industry again obtains.

Ships, after conquering the seven seas, then caused a peaceful assault to be made upon the land, as witnessed especially by the Suez, Kiel and Panama Canals.

And so whichever, in ancient of days, may have been the dominating force in this Trinity, to-day it is ships and commerce that compel the development of ports under the penalty otherwise of deserting them. The development of a port is often a much misunderstood subject.

I suppose that everything of importance that can be said about ports has been said at one time or another at these annual meetings of Port Authorities of the World, and I do not expect to be able to add anything of value to this company of expert and experienced men, but I infer we are addressing a wider audience than merely those within reach of my voice, and popular misconceptions must be dispelled if we are to get popular support for sound and scientific plans of port development.

What Constitutes a Port

To be in the major class a port must be also a great market for both foreign and domestic commerce.

To justify large expenditures for its development it must have a sound and permanent economic basis for its existence.

This may come from having a large producing and consuming population, or because of an especially favorable situation for serving other large communities, or through being a focus of large inland and coastwise transportation systems, or because it is a great financial center serving as a clearing-house for money and exchange as well as goods. Unless a port has some one or more such economic bases to ensure it a permanent share in trade any large investment in its development will be hazardous.

You can dam up the flow of economic currents for a while by artificial means, only to be swept away in a flood of disaster later, but you cannot make trade currents flow permanently in uneconomic channels, against the competition of the world, by any artificial power yet discovered.

Economic law and necessity springs from we know not where, but it is the most inevitable as it is the most irresistible of all laws, and, like time and tides, it waits for no man. To study and understand it, to correctly apprehend the trend of its currents and to shape one's course consistently therewith, is one of the first duties as well as a continuing obligation of Port Authorities.

Physical Characteristics

An easy entrance and a safe anchorage of ample capacity is a pre-requisite of any good port. Adequate berthing space is, of course, an essential element, but too often in the public mind the provision of piers solves the port problem. To properly serve commerce a port must be so laid out, organized, equipped and operated that products and commodities can move between rail and ship, ship and warehouse, factory and ship, ocean and coastwise lines in the freest possible manner with the least amount of rehandling, delay and expense.

That means, among other things, a proper zoning system. By that means provision can be made for the most efficient mechanical equipment, designed especially for the different classified requirements so as to save labor. It means unifying all the transportation movements under one directing agency so as to eliminate duplication of effort, unsynchronized movements, confusion and waste of time. The two determining factors in efficiency are the speed of despatch of the ship and the low cost of handling cargo in or outbound.

Port Development as a Public Policy

The movement of freights and the many elements of expense in a port are so involved and obscure that it is difficult even for the experienced to trace the direct effect upon the cost of living and doing business. It is, of course, much more difficult to arouse the public to any comprehension of how it affects them.

The need for cheap and adequate rapid transit of persons the public can see and appreciate every day. It is self-evident and convincing. But the need of a well-organized port and the cost of an inefficient one is so obscure, and therefore generally so uninteresting, a subject that history shows it has taken years of effort in most countries to bring about the necessary legislation to create Port Authorities and to secure public support for financing port improvements.

We have had Navy Leagues and Merchant Marine Societies and many other great popular movements, but when and where have we found a national society or national spirit working for the comprehensive and scientific development of ports?

Generally it is a few enthusiasts who struggle against popular indifference and official prejudice. But a port spirit must be developed, knowledge of the subject must be disseminated, enthusiasm must be aroused, a public policy for port development and conservation must be created. Once born it must be nurtured until its roots have so entwined themselves in public comprehension that they will draw sustenance normally and perpetually for the automatic support of the principle.

Nothing can help more to do this than these annual meetings and the wide dissemination of the information gathered and interchanged on these occasions.

If all the countries are interdependent, if world trade is the life-blood of nations, and who will deny those facts, so are ports matters of both national and international concern. Action and reaction must not only stimulate endeavor, but experience and example will enlighten one and another to the benefit and progress of all.

The Port of New York

Perhaps it would be thought an oversight if I said nothing about my home port.

Nature blessed it with so many natural advantages that for many generations no one thought it necessary to try and improve upon them, or even to use them in any particularly intelligent combination or relation to each other.

* Chairman Port of New York.

Even the Federal Government thought it so well founded in channels and deep-water approach that until a few years ago, though nearly 50 per cent. of the Federal revenues were collected at this port, not more than 2 per cent. of the total Federal appropriations for rivers and harbors had been expended here.

The strategic situation of the Port of New York for the economic ebb and flow of commerce could not be excelled and is not equalled by any other U. S. port.

Situated at the confluence of the Hudson and East Rivers, there are six distinct harbors, each one as large as many world ports—i.e., the Lower bay, Raritan bay, Newark bay, the Upper bay, Flushing bay and Jamaica bay. Several of these are fed by rivers navigable by steamer and barge traffic for many miles, and tributary to which are large cities and industrial communities. The products of the Middle West and the Great Lake districts find the easiest grades and the most natural course through the valley of the Mohawk to the Hudson and thence to the Port of New York. New England's industries are supplied with fuel largely through the port and Long Island Sound, and the products of their factories find cheap water transportation by the same route to the great consuming markets of New York City and its environs and to the radial lines of coastwise and ocean shipping.

With manufacturers within the port district exceeding in value 10% of the manufactured products of the whole United States, with a population of about 8,000,000, with the financial operations of the country largely focussed here, there is a permanent underlying economic raison dêtre for the Port of New York which even neglect to scientifically develop it has not yet impaired.

With approximately 800 miles of shore front, much of it as yet virgin land, most of it available as sites for industries and terminal facilities, there is before us an unlimited opportunity for service to the commerce of the nation and the world, a fascinating vista of possibilities that challenges the spirit of achievement; that needs not courage but only understanding to undertake.

And yet there is no royal road to success. Our path is strewn with many pitfalls and there are many obstacles to be overcome. Old-time habits, customs and prejudices are veritable mountains that have got to be removed. With twelve great railway systems entering the port district, each with its local communities and business of its own to be preserved inviolate, highly competitive with each other for business at points of common contact, competing in speed and quality of service for certain great commodities and industries, there is a reluctance on their part to merge terminal operations on some unified plan lest some of their individual advantages be impaired. Shippers and consignees whose businesses have for years been established at certain points and under certain customs fear the effect of any change even while admitting serious present defects. Every one wants to be shown the economies, but no one wants to be the object-lesson by which the advantages of change are to be demonstrated.

We have a comprehensive plan that has been adopted by the States of New York and New Jersey and approved by Congress and the President. It was first approved by all the commercial and most of the municipal bodies in the port district. It has the force of public opinion and approval behind it. Perhaps it will only be after some constructive reorganization of facilities has resulted in marked economies that some trade and transportation interests will change from hesitation to affirmative support, from fear to favor, and show a real desire to help move the wheels of progress. This plan in brief outline contemplates a circular belt line railway crossing and connecting all trunk lines at points about half-way between the centre and the outer boundaries of the port district.

As part of this belt line there is to be a tunnel under the Upper Bay from Greenville on the New Jersey shore to Bay Ridge on the Long Island shore, thus connecting the nine trunk lines on the western side of the port with the three on the eastern side.

Water-front belt lines are also planned wherever industrial and shipping terminal sites promise tonnage sufficient to support them. Classification yards and consolidation points at suitable locations for lighterage stations are planned to save the great waste now incurred through duplication of effort and inefficient use of equipment by twelve systems operating individually.

Ultimately direct transfer from railroad car to ship and vice versa on all bulk cargoes is expected to be brought about, and when suitable terminals have been constructed much general cargo originating at or destined to interior points may be so handled at a minimum expense.

Financing Port Improvements

The greatest port developments have had to be accomplished on the credit of the undertakings, unsupported by government guaranties or the power to tax.

This meant on public confidence in the men in charge and the pressure of sheer necessity for the improvements. There may be an element of safety in this as a preventive of hasty or visionary plans. On the other hand, it means slower progress, as the economic justification for each step has to be worked out to the satisfaction of investors, whose only security will rest on the self-supporting character of the work itself.

It is on this basis that the Port of New York Authority must finance its undertakings, and a great deal of time must necessarily be taken in analyzing traffic and working up costs of construction and operation and the savings to result therefrom in advance of offering securities or beginning work.

Most of the other Port Authorities in the United States have state or municipal credit, or both, pledged to their securities to assist them.

As Liverpool and London Port Authorities have always managed on their own, so we of New York approach our work confident in the belief that investors will be found alive to the needs and having faith in the possibilities who will absorb our bonds when we are ready to offer them. Though we have no power to pledge the credit of either state or of any municipality, without their consent, nor the power to tax, so likewise the States and Federal Government have relinquished the right to tax our securities and therefore we shall possess whatever advantage in interest rates tax-free securities may continue to have.

In Conclusion

While the varying conditions and characteristics of different ports will always require special treatment in their development, is it not possible that certain broad fundamental principles and standardization may be worked out, flexible enough to be adapted to varying conditions and yet so similar in service and operations that in the fullness of time wherever ships go they may find themselves, so to speak, at home, adaptable to their surroundings, which in turn may be found part of a great world system of cogs, each part fitting to the other, operating without friction, efficiently and economically in the interest of world trade?

It is a privilege to meet and be granted a hearing in such a gathering as this.

With much appreciation of, and many thanks for, your courteous attention, I thank you.

A NEW MARINE INTERNAL COMBUSTION ENGINE

A well-known British firm, the Ailsa Craig Motor Co., Ltd., Strand-on-the-Green, Chiswick, London, W 4, has recently produced a standardized model of their well-known engine manufactured on mass production lines. This engine is to be known as the "Ailsa Craig Kid." It is of 10 to 14 H.P. and would be suitable for boats from 18 to 30 feet in length. It has, however, been installed with success in some fishing boats 42 feet in length working in the Bay of Biscay, these vessels obtaining a speed of 9 miles per hour.

In this model the makers have attempted to retain British quality and yet bring the price down so that it is no greater than that of similar articles made by our foreign competitors. The well-known features of the Ailsa Craig engine, such as the silent plunger water pump, totally enclosed and self-lubricating working parts, easily removable inspection doors, one lever control, etc., have been incorporated in this cheaper model. The low price is entirely due to the elimination of unnecessary parts and to the standardisation of the others. The materials and workmanship are of the same class as in the more highly priced model.

In view of the uncertainty as to the nature of fuel to be used in various parts of the world during the next decade the Ailsa Craig Company has made

a feature of the carburation device so that it can be modified at small cost to burn paraffin, petrol, alcohol, natalite, benzole, etc. The engine will be supplied in this respect to meet the customer's requirements. Should he desire at some future time to change to some new fuel the matter can be arranged with the minimum of trouble and expense. Spare parts will be supplied at a low price from stock and by reason of the standardisation are guaranteed by the firm to fit. The general details are the result of over thirty years' experience with marine motors in all parts of the world and the fact that the Ailsa Craig models already on the market give no trouble to their owners will undoubtedly secure a good market for this new model.

As an indication of the price it may be stated that the engine, complete with enclosed reverse gear and stern gear and with propeller and shaft is quoted at £110. The only extras are for tank equipment, fittings for a change of fuel and such items as buyers may prefer to have an option of purchase or which may require adaptation to the shape of the hull to which the engine is fitted.

LEADING BRITISH PORTS

Cardiff.—Cardiff is the largest and most important city in Wales and one of the first ports in the world for the shipment of coal. The unrivalled geographical position of Cardiff, with its superior dock accommodation and facilities, and rail and water connections, offers exceptional advantages for the distribution of merchandise to all parts of the Kingdom. With the despatch ensured by modern methods of handling, delivery at inland centres can be generally guaranteed within a very short time after the vessel's arrival at her berth, and cargo for export can be delivered and shipped at the docks with equal promptitude. Valuable means of communication are furnished by the coastwise services between the Bristol Channel ports, most of which are reached within three to four hours. Large quantities of grain, provisions, and general merchandise are distributed in this way.

There are also regular lines of steamers trading to Liverpool, Manchester, Glasgow, the principal Irish ports, London, and Hull, and frequent and regular steamship communication with European, Empire and foreign ports.

The Bute West Dock and Basin.—This, the oldest wet dock in Cardiff, is entered from the open channel through a basin 1½ acres in extent. The dock is equipped with 12 coal hoists and 4 hydraulic cranes for the discharging of timber, ballast, etc. It is 4,000 feet long and 200 feet wide, with a depth of water on the sill of the sea lock at O. S. T. of 28 feet 9 inches. There is a quayage of 8,800 feet in length.

Bute East Dock and Basin.—This dock consists of a deep water area of 44 acres with a basin of 2¼ acres and a sea lock from the entrance channel 220 feet long and 55 feet wide, with a depth of water on the sill of the sea lock of 31 feet 9 inches O. S. T. It is 4,300 feet long, and varies in width from 300 to 500 feet. There are 17 staiths here for the shipment of coal, and 19 hydraulic cranes with lifts varying from 2 to 20 tons capacity. There are three warehouses for the accommodation of general import trade, while leading from the dock are 3 graving docks 400 feet, 408 feet, and 420 feet long. The railway extends from this dock right into the heart of the Welsh coalfields, thus providing a quick and ready access from the collieries.

Roath Basin.—Although constructed over 40 years ago the equipment of Roath Basin is quite modern. Access is gained by a lock 350 feet long and 800 feet wide. The Basin is connected with the Bute East Dock by a junction lock, the effective length of which is 60 feet. The depth of water on the outer sill of the lock is 35 feet 9 inches O.S.T., and 25 feet 9 inches O.N.T. There is a quayage space of 2,700 feet, and a water area of 45 acres.

Roath Dock.—This dock is a continuation of the Roath Basin and is connected with the latter by a lock. The inner lock is 600 feet long and 80 feet wide. The depth of the water in the dock ranges from 32 to 37 feet. There is a deep water area of 32 acres which gives 7,520 feet of quayage. The equipment of the Roath Dock is superior to that installed in the older docks. In order to obtain the maximum amount of quay space the dock walls are entirely constructed of masonry, thus enabling the company to instal a larger number of shipping appliances than would otherwise be possible. A very large part of the import traffic is dealt with at this dock and for this purpose there are 37 hydraulic cranes. On the south side of the dock there are 11 Lewis Hunter coaling cranes by means of which work can proceed without interruption at the rate of 300 tons per hour. Adjoining the Roath Dock are the cattle lairs with accommodation for 10,000 head of cattle and pens for 1,000 sheep and pigs. Cattle are discharged on to the quayside and driven straight to the cattle lairs, to which slaugher rooms and chill rooms are attached. Towards the north end of the dock are the cold stores which are built upon a jetty enabling vessels to discharge at either side without being interfered with in any way by other traffic. These stores are fitted with all the necessary appliances for giving despatch to the discharging and storing of perishable cargoes. Hydraulic lifts are provided to receive the deliveries from the cranes and distribute them to the various floors of the stores. The storage capacity is 125,000 cubic feet.

Queen Alexandra Dock.—This dock, which is nearly half a mile long, has a water area of 52 acres and is connected by an inter-communication passage with Roath Dock. There is a breadth of 800 to 1,000 feet and a uniform depth of 50 feet from the top of the coping. It is the nearest dock to the open channel and is entered direct from the sea. The sea lock is 850 feet in length and 90 feet in breadth, with a depth of water over the sill of 42 feet O.S.T., and 32 feet O.N.T. It has an excellent approach, is well sheltered, and is in close proximity to the Penarth Roads, which is one of the safest anchorages in the Bristol Channel. The whole of the north side of the dock is reserved for the import trade, and is equipped with the most up-to-date plant for the rapid and efficient handling of this traffic. There are 10 hydraulic and 6 electric cranes with a lifting capacity ranging from 1½ to 2 tons. All of these cranes are movable. Five transport sheds are erected giving a floor space of 40,000 square yards, and ample provision has been made for stacking timber adjacent to the quays.

The cold storage at this dock has a capacity of 300,000 cubic feet. Large vessels can be berthed alongside and the meat discharged direct into the stores. These stores are of the latest design and are equipped with all modern appliances for rapid and efficient handling. The railway lines run parallel with the whole length of the cold chambers enabling meat, etc., to be loaded direct into the refrigerating vans for conveyance to all parts of the country.

The south side of the dock is equipped with coal shipping appliances, including 8 Lewis Hunter cranes, and 6 movable hoists ranging up to 60 feet in height from the quay level, and so arranged that 3 or even 4 can ship into different hatchways at one time. The south side of the dock is provided with extensive accommodation and there is ample space for banking purposes.

The railway company undertake at reasonable rates the discharge, landing, forwarding, and warehousing of all kinds of goods. When dealing with heavy machinery, powerful hydraulic and steam cranes are provided. These cranes are capable of lifting up to 70 tons weight to a height of 74 feet from quay level, which gives great facilities in loading and discharging heavy machinery from and on to vessels.

There are few ports better equipped with facilities for undertaking the work of dry docking than Cardiff. Vessels come from distant parts to effect repairs, and the numerous firms who deal with this particular work are well equipped with the necessary gear for undertaking work of any magnitude. There are 12 graving and floating docks ranging up to 800 feet in length and 70 feet in width, and one public gridiron 350 feet in length. The docks are linked up with all the Grand Trunk Railway Systems of the United Kingdom.

Pilotage at Cardiff docks is not compulsory in normal times, the docks being easy and safe.

Cardiff is now included in the Great Western Railway group, and the advantages of this amalgamation are indicated by the announcement that the company has decided on the expenditure of £550,000 as a first step towards the improvement of the Bute Docks.

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A Timely Statement

IN ANOTHER portion of this issue we print an extract from the address given by Sir Frederick Lewis, the chairman of Furness Withy & Co. on the views of British shipowners regarding the U. S. merchant fleet. This statement should go a long way to assuring the people of the United States that the rumors of propaganda directed by British shipowners against American shipping are baseless, if only the American people had the opportunity to read it. Unfortunately, the views that they have served up to them, are those of yellow journalism, and pot hunting politicians. Both of these sources of information are vitiated.

There is room on the sea in normal times for the vessels of every nation, and the more facilities that exist for the transportation of the goods of one nation to the ports of another, the more free are the channels of trade, and the result is beneficial to every one. The enormous tonnage brought into being by the United States has created a problem which naturally presents difficulties in working out, and these problems are not made any less by the adoption of high handed methods towards the shipping of other nations.

The people of the United States are not a maritime people. A comparatively small portion of them live on the sea board, and a very small proportion of them have any intelligent conception of the problems involved in the successful operation of a great fleet. Their mercantile marine has proved itself a costly burden, and under the influence of some ill-informed politicians, a large section of the population has become persuaded that the way to make the fleet self-sustaining is to bar their ports and the carriage of their goods to any but their own ships. They seek to accomplish this by passing discriminatory laws against the vessels of any other nation. They also seek to help their fleet out by the use of subsidies.

The granting of subsidies is a purely domestic matter, as has been pointed out by Sir Frederick Lewis, and other high authorities. The passing of discriminatory laws becomes a matter of international concern, and, if carried out, may well be fraught with results that would place the U. S. mercantile marine and the U. S. people in a worse fix than they are at present.

Great Britain has built up her overseas trade and her predominant mercantile marine under a policy of absolute freedom of the seas. If this policy has been so successful in the case of one nation, there is no good reason why it should not be in that of another, so long as the same capabilities of management, and vision of possible openings is possessed. As we have often remarked, anybody can build ships, but the operation of them is a much more complicated matter, and its principles are not to be grasped without many years of study and experience of actual conditions.

The "Egypt" Judgment

THE COURT OF enquiry which sat to determine the placing of the blame for the loss of the P. & O. steamer "Egypt," and the accompanying loss of life due to collision with the French steamer "Seine," delivered a judgment which has caused a good deal of comment.

The certificate of the master was suspended for six months, not for any fault of navigation, but because, in the opinion of the court, everything was not done that should have been done for the saving of life after the collision occurred. The owners of the vessel also came in for censure, on account of not having seen that proper boat drill was carried out before the vessel sailed.

After the collision took place, it was but a very short time until the vessel took such a severe list that it was impossible to launch the boats on the starboard side. The vessel's crew outside of the officers consisted of Lascars and Goanese, the latter being mostly in the steward's department. There seems to be no doubt that confusion set in among a number of these men, and this undoubtedly handicapped the officers very considerably in their efforts to get the boats away and the passengers into them.

The general opinion is that the court was unduly severe in suspending the master's certificate, and in censuring the chief officer. On the evidence as given in the enquiry, there seems little doubt to the onlooker that both these gentlemen did their very best under very difficult circumstances, and truly uphold the traditions of the British seaman.

We have often wondered how the gentlemen who sit as judges on these enquiries would show up if they were themselves placed in the position of those they are passing judgment on. The atmosphere of a court of enquiry is very far removed from the atmosphere that prevails on the deck of a crowded ship when death is imminent, and there are numbers of people present to whom the sea is a terror at any time. With darkness prevailing, a crew gone wild with fright, and a crowd of terror-stricken passengers, the responsibility devolving on the shoulders of the one or two superior officers of the ship is a terrible one.

There was no question of the bravery of either the captain or chief officer, the finding of the court being based on the fact that the crew did not know their boat stations, and that the watertight doors were not properly handled.

The suspension of the captain's certificate is a much more serious matter than would appear from the mere statement that the period of suspension is six months. It means that the unfortunate captain is a marked man in the office of every underwriter for all time to come, and his prospects of getting a command after the suspension is worked out, are very slim.

Latest Movements of the C. G. M. M.

Sept. 18, 1922

Steamer and Voyage	Sailed From	Arrived At	Sailed From	Arrived At	Routed
Aviator (15)	Mont'l. Aug. 24	Gibralt'r Sept. 9	Gibralt'r Sept. 10		Montreal, Barbados.
Beaver (14)	Mont'l Aug. 3	Barb'd's Sept. 3	Barb'd's Sept. 12		Montreal, Barbados, Trinidad, Demerara, Quebec, Montreal.
Britisher (2)	Vanc'r June 12	Honolulu Sept. 10	Honolulu Sept. 16		Vanc'r Sydney Newcastle, Adelaide, Melbourne, Honolulu, Astoria, Vancouver.
Carrier (9)	Mont'l Aug. 12	Glasgow Sept. 1	Glasgow Sept. 6	Quebec Sept. 18	Pt. Mont'l, Avonmouth, Glasgow, Quebec, Montreal.
Challenger (4)			Montreal Sept. 14		
Coaster (9)	Mont'l Sept. 13	Psd. Fame Pt. Sept. 15			Mont'l, Sydney, Barbados, Trinidad, Demerara.
Command'r (9)	Mont'l Sept. 15	Quebec Sept. 16	Quebec Sept. 17	Psd. Father Pt. Sept. 17	Montreal, Quebec, London, Rotterdam.
Conqueror (9)	Mont'l Sept. 9	Sydney Sept. 13			Montreal, Sydney.
Construct'r (2)	Mont'l Aug. 26	Antwerp Sept. 14			Montreal, London, Antwerp.
Cruiser (3)	Mont'l July 26	Hull Aug. 27	Hull Sept. 9		Montreal, Quebec, Chatham, London, Hull.
Explorer (6)	Mont'l July 29	Colon Aug. 19	Panama Aug. 19		Montreal, Sydney, Australia, New Zealand.
Farmer (21)	Vanc'r Sept. 17				Vanc'r, Blaineys, Nanaimo, Oc. Falls.
Fisher (15)	Mont'l Sept. 14	Psd. Fame Pt. Sept. 16			Montreal, Bermuda, Nassau, Kingston, Belize, Montreal.
Forester (14)	Mont'l Aug. 24	Kingston Sept. 14	Kingston Sept. 16		Montreal, Bermuda, Nassau, Kingston, Belize, Montreal.
Freighter (4)	Vanc'r Sept. 7				Vanc'r, Yokohama, Bombay, Pt. Sudan.
Gunner	Mont'l Sept. 13				
Harvester (9)	Mont'l Aug. 16		Barb'd's Sept. 12		Mont'l, Barbados, Trinidad, Demerara and Montreal.
Highlander (5)	Vanc'r May 31	Newcastle Aug. 7	Newcastle Aug. 24		Vanc'r, Victoria, Honolulu, Auckland Sydney, Melbourne, Adelaide, Newcastle, Pt. Allen.
Hunter (11)	Mont'l Aug. 6	Barcelona Aug. 27	Barcelona Sept. 6		Montreal, Sydney, Gibraltar, Barcelona, Patras.
Importer (6)	Vanc'r Bassein June 13	Sept. 11			Vanc'r, Miike, Bombay, Madras, Bassein.
Inventor (6)	Vanc'r Sept. 6				Vanc'r, Yokohama.
Leader (3)	Halifax Apr. 29	New York Sept. 15			Halifax, Australia, N. Zealand, N. York, Montreal.
Logger (7)	Mont'l Sept. 2	Barb'd's Sept. 15	Barb'd's Sept. 15		Mont'l, Barbados, Trinidad, Demerara.
Mariner (7)	Mont'l July 6	Three Rivers Sept. 17			Montreal, St. Anne d' Monts, Martin River, Garston, Liverpool, Three Rivers.
Miller (12)	Mont'l Sept. 1	Liverpool Sept. 16			Mont'l, Liverpool.
Navigator (17)	Mont'l Sept. 1	Cardiff Sept. 14			Mont'l, Cardiff, Swansea.
Observer (22)	Vanc'r Sept. 5	Astoria Sept. 12	Astoria Sept. 12		Vanc'r, Nanaimo, Oc. Falls, Astoria, San Francisco.
Otter (10)	Mont'l July 27	Quebec Sept. 18			Mont'l, Cardiff, Swansea, Quebec, M't'l.
Pioneer (9)	Mont'l July 21	Barry Sept. 9			Mont'l, Liverpool, Barry.
Planter (5)	Mont'l May 31	Auckland Sept. 1	Auckland Sept. 6		Mont'l, Sydney, Australia, New Zealand, New York.
Prospector (7)	Vanc'r July 18		Dairen Sept. 8		Vanc'r, Shanghai, Dairan, Dalny, Vanc'r.
Ranger (17)	Mont'l Aug. 13	Cardiff Sept. 15			Mont'l, Quebec, Devonport London, Cardiff.
Rover (18)	Vanc'r Sept. 8		Oc. Falls Sept. 16		Vanc'r, Nanaimo, Oc. Falls, Astoria.
Runner (11)	Mont'l Aug. 17	Swansea Sept. 5			Mont'l, Cardiff, Swansea.
Sapper (30)	Mont'l Sept. 6	St. John's Sept. 14	St. John's Sept. 15	Psd. C. Race Sept. 16	Mont'l, Charlottetown, St. John's, Mont'l.
Scottish (3)	Vanc'r Sept. 8				Vanc'r, Auckland.
Seigneur (13)				Mont'l Sept. 9	
Signaller	Quebec Aug. 20		Waddington Sept. 16	Mont'l Sept. 18	Quebec, Trisito Bay, Sorel, Morrisburg, Waddington, Montreal.
Skirmisher (3)	Vanc'r July 13	Newcastle Sept. 11			Vanc'r, Sydney, Melb'rne, Adelaide, Newcastle.
Spinner (8)	Mont'l Aug. 17		Manchester Sept. 15		Mont'l, Liverpool, Manchester.

Latest Movements of the C. G. M. M.

Steamer and Voyage	Sailed From	Arrived At	Sailed From	Arrived At	Sept. 18, 1922 Routed
Squatter (10)	Mont'l Aug. 22	Avonmouth Sept. 16			Mont'l, Greenock, Glasgow, Avonmouth.
Transp'rt'r (3)	Vanc'r Aug. 29	Pt. Alberni	Pt. Alberni Sept. 15	Vanc'r Sept. 16	Vanc'r, Chemainus, Esquimalt, Genoa Bay, Pt. Alberni, Vanc'r.
Traveller (4)	Vanc'r Aug. 12	Auckland Sept. 10	Auckland Sept. 14		Vanc'r, Auckland, Sydney.
Victor (8)	Mont'l July 4	Adelaide Sept. 11	Adelaide Sept. 13		Mont'l, Australia, N. Zealand.
Volunteer (14)	Mont'l July 21	Swansea Aug. 29	Swansea Sept. 15		Mont'l, Chaleur, Cardiff, Swansea, Montreal.
Warrior	Mont'l Sept. 8	Psd. Fame Pt. Sept. 10			Montreal.
Wianer (6)	Vanc'r Aug. 12	Shanghai Sept. 15			Vanc'r, Kobe, Shanghai.
Silba	Halifax Sept. 9	Little Bras d'or Sept. 11			
Tolmie (2)	Vanc'r July 10				Vanc'r, Australia.
Raider (12)	-	-	-		Montreal. May 16.
Rancher (9)	-	-	-		Montreal. May 17.
Trapper (12)	-	-	-		Montreal. June 23
Trooper (14)	-	-	-		Montreal. July 9
Advent'r'r (11)	-	-	-		Midland. Apr. 23
Engineer (2)	-	-	-		Goderich. Dec. 3.
Pathfinder (2)	-	-	-		Midland. Dec. 4.
Sailor (17)	-	-	-		Goderich. Dec. 4
Sower (11)	-	-	-		Midland. Dec. 6.
Trader (13)	-	-	-		Midland. Dec. 4.
Drummond (7)	-	-	-		Collingwood. June 9.
McKee (4)	-	-	-		Goderich. Dec. 12.
Miner (18)	-	-	-		Halifax Nov. 25.
Sealer (14)	-	-	-		Halifax Dec. 20.
Settler (11)	-	-	-		Halifax Jan. 13.
Voyageur (12)	-	-	-		Halifax Dec. 15.

Press Comment on Marine Matters

CANADIAN AND U. S. PORTS

FOLLOWING complaints that Canadian grain shipped through American ports emerges inferior in quality, Mr. Robb, the Minister of Commerce, is endeavoring to have more Canadian grain shipped through Canadian channels. The task will be more difficult than it seems. Grain, like all other freight, follows channels that are most speedy and most cheap. And just because it sometimes costs less and nearly always is more prompt to ship Canadian grain from New York than it is to have it hauled to and shipped from either Halifax and St. John, it is but natural that it should go to New York. The bulk of Canadian grain comes upon the market after Montreal port is closed. This means that if Canadian grain is to be sent through Canadian channels it must be shipped to Halifax, which is a long railway haul, or to St. John, where ships have to come up the Bay of Fundy and pay high marine insurance as a consequence. New York, on the other hand, can be reached more speedily, and, what is more, there are always more boats there ready to take cargoes.

Undoubtedly, however, an effort should be made to ship through our own ports. Not only because it is our duty to build up our own harbors, but because grain going through Canadian channels benefits Canadian railways, which, Heaven knows, need all the benefit they can get. Perhaps some measure of remedy might be found in the suggestion that British buyers insist on Canadian shipments going through Canadian ports.—Ottawa Journal.

FOR DEEP WATERWAYS

THERE has been no more effective presentation of the case for deep waterways at any time by any person than that of Mr. F. H. Keefer before the members of the Montreal Board of Trade during their visit to Port Arthur. He laid a solid foundation for his statement of the vital importance of cheaper transportation rates to the prairie provinces by pointing out that the grain growers of Canada compete in the world's markets against Australia, the Argentine and other wheat-exporting countries that grow cereals far nearer the seaboard than the Canadian wheat fields are, and that are, therefore, in an extremely favorable position because their grain has to bear the cost of a short rail haul.

Canadian wheat has to pay heavy all-rail rates to the seaboard, or the unnecessary cost of double transshipment and the

haul in small vessels from the foot of Lake Erie to Montreal. Mr. Keefer put the case most concisely and conclusively in the following passage of his speech:

"You look out upon these ports of Port Arthur and Fort William and you see the large lake steamers, 550 feet in length, leaving here with the produce of these Western farms, transporting same to the foot of Lake Erie for 2 cents and less a bushel, but if that same grain has to be transported to Montreal the cargo of the big freighter carrying 500,000 bushels takes five or six smaller ships of St. Lawrence Canal size capacity to carry same from Port Colborne to Montreal, plus the cost of unloading and reloading in the smaller ships. The big lake freighter travels some 900 miles in about five days' journey for the 2 cents, but it costs for the five smaller shipments from Port Colborne to Montreal, some 300 miles, four or five times the 2 cents. Why should not that big ship be enabled and permitted to carry her cargo straight through to Montreal and unload there, instead of at Port Colborne, or letting the wheat go to New York via Buffalo, and thus put into the producers' pocket this wasted money in employing several small light draft ships instead of one? A saving of 5 cents a bushel on grain can be made if the big ship is enabled to carry through to Montreal. The 5 cents a bushel would be a saving or increase in price to the Western producer.

The only argument against this policy of canal deepening to which the people of Canada would be at all inclined to pay heed is that of cost. The national burdens are great and tend to grow heavier at a time when we should be seeking to pay off some part of our war obligations instead of adding to the volume of our debt by the construction of public works that might be deferred. Mr. Keefer once more demonstrates that while the deepening of the channels of the Upper St. Lawrence may add to the gross debt of Canada it will not add to the tax burden, because the sale of the power that will be derived from the deepening of the waterways—as a by-product of that work—will pay the entire interest and sinking fund upon the investment and provide enormous quantities of electric energy at rates much cheaper than those now in force.

Mr. Keefer frankly admits that the beneficiaries of the great power monopolies in and about Montreal may have good reasons, from their point of view, for opposing the deepening of the St. Lawrence, but he does not understand why the business men of that city, not financially interested in power development projects, should oppose the deepening of the ship channel. A few vessels might go past Montreal, directly from the ocean to upper lake ports, but the business of Montreal, and especially the shipping business, would be greatly increased because of the cutting out of the transshipment now necessary at Lake Erie ports. Mr. Keefer considers that anything which reduces the cost of handling grain by the St. Lawrence route will benefit Montreal and that the opposition of New York and Buffalo to the project should be taken as conclusive evidence that Montreal will be benefited by the diversion of great quantities of grain and other products of the Mid-West and our own prairie provinces to the St. Lawrence route.

Mr. Keefer has done a service to the whole country, and to the business community of Montreal in particular, in setting forth so plainly the reasons why the great port of the St. Lawrence should not seek to obstruct a project that will do much toward anchoring the grain growers of the West on the land and improving the transportation conditions that make it difficult at present to compete with their rivals in other lands situated nearer the seaboard where the cost of rail haulage is relatively light and the producers can, therefore, obtain a greater share of the price paid for their grain.—Toronto Globe.

MARITIME CLAIMS

IN his address at the opening of the exhibition Lieut-Gov. Pugsley gave utterance to a thought that has been in the minds of many public men of the Maritime Provinces in the last few years, and to which others besides the governor have given expression. His Honor dwelt upon the transportation question, and the preference given to American over Maritime Province ports in the export of Canadian products and the import of products from overseas. He pointed out that the east and west policy of Laurier and Borden is not being carried out, and as a result the Maritime Province railways and ports are not getting a square deal; and he declared that if the people's money was to be used to carry traffic away from Canadian ports it would eventually cause a severance of the Maritime Provinces and those of the west. This, he said, was not a threat, but merely a statement of the inevitable. It would be well if those in authority at Ottawa took note of the feeling that had been aroused in these provinces. If New Brunswick, for example, were out of the confederation, the provinces west would have no winter port reached through Canadian territory. It is not at all surprising, in view of the treatment these provinces have received, that there is a growing restlessness and a more insistent query as to what they have gained or have now to gain by their connection with provinces which prefer to do business through foreign ports. No doubt the Maritime Board of Trade will give this subject the consideration it deserves at the hands of so representative and influential an organization.—St. John, N. B., Star.

THE RIGHT KIND OF ENERGY

FOR the first time in history a Canadian firm in British Columbia has chartered ships to carry coal from one outside port to another.

This feat occurred a day or so ago, when the Canadian Trading Co., of Vancouver, announced that five Canadian Government Merchant Marine steamers would be used to carry coal from Newcastle to Pacific ports in the United States.

Any "first time" is an event. It represents initiative and energy above the ordinary.

And it is just the kind of initiative and energy that Canadians need to establish themselves in the commercial world.

The opportunities for commercial development have been enumerated time and again. Prophets have been straining their throats hoarse to tell us all about future prosperity.

Only one element has been lacking—the will to go and get it.

Now, with a concrete instance and going and getting it, right before the public there is more reason for optimism. British Columbians, apparently, are waking up.—Vancouver Sun.

ICE AND THE WATERWAYS

AT the banquet tendered to the American Association of Port Authorities, Mr. Church warmly advocated the deep waterways plan, and remarked that while coal miners might go on strike the St. Lawrence River never went on strike. He was answered by Hon. John Cole of Boston, who said that the St. Lawrence went on strike for four months every year, when it was frozen.

As a joke this will pass, but it misses Mr. Church's point. The waterways scheme includes the development of power as well as navigation, and the water would flow all the year round. Needless to say, Mr. Church would not advocate better navigation as a substitute for coal, though it would help us to get coal from Nova Scotia.

There would, however, be solid advantages in deep waterways even for eight months in the year. — Toronto Globe.

Views of British Shipowner on U. S. Competition

Sir Frederick Lewis, President of the British Chamber of Shipping, Points Out That Discriminatory Measures Adopted by Any Nation Inevitably React on That Nation

IN THE midst of the many misleading statements that are circulated by certain sections of the United States press, on the attitude of British shipowners to the United States merchant marine, the following extract from the Presidential address of Sir Frederick Lewis, at the annual meeting of Furness Withy & Co., is well worth reading.

Sir Frederick occupies a very high place in the British shipping world, and his remarks may be well taken to represent the feeling of British shipowners in general. His position as President of the British Chamber of Shipping should be a sufficient guarantee of the weight of the views expressed in his statement, which is as follows:

United States Competition

I have on many occasions, both in my capacity as chairman of a number of representative British shipping companies and as President of the Chamber of Shipping of the United Kingdom, made a point of explaining what I conceive to be the attitude of British shipping towards the United States mercantile marine. Yet I am afraid that attitude is still misunderstood in certain quarters, as I am repeatedly hearing reference to the propaganda which it is alleged British shipping interests are directing against the growth and development of the United States mercantile marine. I desire to state publicly and emphatically that there is no such propaganda on the part of British shipowners, and any reports to the contrary are calculated to create an unfortunate atmosphere. We appreciate to the full the circumstances under which the United States became possessed of its present mercantile fleet, and because of these circumstances we have watched with sympathetic interest the difficulties with which they are confronted in their endeavors to turn a wartime product into a commercial asset instead of the liability it now is. But just as the United States, having acquired its vessels during the war, cannot be expected to scrap them at the end of the war, so we, having by the work of generations built up a large mercantile marine before the war, cannot be expected to give up and sacrifice our trades after the conflict is over. After all, the existence of our pre-war mercantile marine was one of the greatest factors in securing victory for the Allies.

We have these definite conditions to face, that Great Britain has no increase in Mercantile Marine as compared with pre-war, whilst the United States has increased in ocean-going shipping from under 2,000,000 to 12,500,000 gross tons. That problem seems to me to be only capable of solution by friendly co-operation with the object of increasing the trade of the world. I would be the last one to suggest that any stranger has the right to interfere in a nation's domestic affairs and, consequently, British shipowners do not claim any right to express an opinion upon the direct subsidy proposals which the United States are contemplating for the benefit of their Mercantile Marine, but when these proposals extend to the point of discrimination against British and other foreign shipping in United States ports, then quite different considerations arise. If the citizens of the United States consider that the payment of a subsidy is the best method by which to establish and maintain their Mercantile Marine, and to encourage private ownership, and incidentally, perhaps, to rid themselves of a cumbersome national fleet, that is entirely a matter for them to decide, and time alone will show whether that policy is right or wrong, but the legislation which is at present being considered goes a great deal further than this, in seeking to control and direct international commerce in favour of the vessels of the United States at the expense of all others.

The Basis Of International Shipping

The only true basis of international shipping is that the vessel that can carry the goods most cheaply, without any artificial restrictions or incentives, shall do the trade. Any other policy adopted by any country simply means unnecessary taxation to its citizens, and higher costs for the commodities it imports and exports. Great Britain has for a great many years past not only upheld but also given practical effect to the doctrine of freedom of the seas by giving in her ports equal treatment and opportunities in every respect to the vessels of all flags, whether the foreign vessels comply with the British standard or not, and it is well worth while making a short study of the history which at present governs the situation as between Great Britain and the United States.

Under the old Navigation laws, which were terminated in the middle of the last century, Great Britain claimed the right to discriminate in its ports against vessels of other flags, and the imposition of restrictions and discrimination led to counter-discrimination by other nations until an impossible situation was reached, and then the slate would be wiped clean for a short while until one side or the other commenced the same thing over again. Under that policy, Great Britain reserved the trade with its oversea possessions and its coasting trade to her own vessels, and so long as the American States were dependencies of the British Crown, their ships could trade with all British Dependencies, but after they became independent, their ships, like all foreign vessels, were for many years shut out from the carrying trade of the British West Indies.

The situation constantly led to friction, and when Great Britain altered her policy, she did so on the assurance that the United States was willing to agree to universal reciprocity in the widest sense. In a formal communication, dated Nov. 3, 1847, the American Ambassador in London wrote:

"Universal reciprocity in the widest sense is held by the American Government as the only thoroughly appropriate basis for intercourse between two great nations. The prohibition of the indirect trade has but restrained enterprise; it has done good to neither country. To abrogate it would at once set free tremendous commercial wealth without injuring anyone.

"Should Her Majesty's Government entertain similar views the Undersigned is prepared on the part of the American Government to propose that British ships may trade from any port of the world to any port in the United States and be received, protected, and in respect of charges and duties be treated like American ships if reciprocal American ships may in like manner trade from any port in the world to any port under the dominion of Her British Majesty.

"The removal of commercial restrictions, while it would be of mutual advantage to the material interests of both countries, could not but give openings to still further relations of amity between them and by its influence on the intercourse of nations create new guarantees for the peace of the world."

The Freedom of the Seas

In 1894, relying upon the assurance of the American Ambassador that America would do all that Great Britain did, a Bill was passed through the British Parliament throwing open all trades to vessels of all flags, the coasting trade of Great Britain alone being excluded, the United States having previously made it clear that their proposals did not embrace the coasting trade of their own country. In the same year the United States Government put in force a previously existing law by which they reciprocated the policy of equality for all.

In 1854 Great Britain threw open in addition its coasting trade to vessels of all nationalities, but this action has never been reciprocated by the United States. The bargain thus made in 1849 has hitherto been kept, and in all foreign trades vessels under the British

(Continued on page 20)

September Fiction

Sorrowful Island

By Bertrand W. Sinclair

Treasure!!——————Yes!!

But not the hoard of shining gold the opening scenes of this vivid tale promise.

Round the hidden store so gruesomely guarded by the flesh-bare bones of an unknown pioneer, the author has staged a tale of a struggle for life and living on a lonely wooded isle off British Columbia's rugged coast which carries you interested and breathless to its dramatic climax.

"A Case of Amnesia"

By Napier Moore

Irresistibly funny
Ludicrously laughable
Excruciatingly humorous

"The Timber Pirate"--(*Part 3*)

Another stirring installment of this gripping serial.

J. K. MUNRO in another of his sparkling political satires.

"PIERRE DES LACS" by Benge Atlee, a fine romance of Acadia.

These and many other interesting features are in

Sept. 15th Issue **MACLEAN'S** Sept. 15th Issue

"CANADA'S NATIONAL MAGAZINE"

On Sale at all News Stands

VIEWS OF BRITISH SHIPOWNER ON U. S. COMPETITION

(Continued from page 18)

and American flags have been on an equality in the ports of both countries.

So much for past history. The legislation that is now being considered in the United States would entirely destroy the principle upon which the present relationships between the mercantile marine of the British Empire and the United States is founded, and it certainly appears to be inconsistent with the spirit of the Washington Conference.

As I have said, I do not think any stranger has the right to interfere in a question of a nation's domestic policy, and, consequently, I have never heard any British shipowner so much as suggest that the United States is not entitled to grant a State subsidy to its shipping, if it is considered that this is the best method of establishing its Mercantile Marine. But the proposals go a great deal further than this, and contain many discriminatory clauses which will be inimical to British shipping interests. It is proposed to grant rebates of income-tax to shippers who send their freight by American vessels. It is proposed that a fixed percentage of emigrants brought into the country shall only be admitted by American steamers. It is proposed to double the tonnage dues, and whilst the increased dues will be levied upon American and foreign vessels alike, the increased revenue so derived is to be credited to the fund from which the subsidy is to be paid, so that in effect foreign vessels are to be made to contribute towards the subsidy payment by which it is hoped to build up and develop the United States marine.

It is proposed to include the Philippine Islands in the coasting trade, although I believe it is a historical and economic fact that two-thirds of the industries of the Philippines were created with British capital prior to being taken over by the United States.

British shipping has all along been prepared to welcome the American Merchant Marine, and to proceed along lines of friendly co-operation and friendly rivalry, but that spirit must be reciprocated if it is to be enduring.

All the matters to which I have referred directly concern British shipping, but they go further because restrictions on the use of shipping always react disastrously on the free flow of overseas commerce. To concede to any nation the right to impose discriminatory measures against vessels under other flags is an admission that overseas commerce with that nation is the exclusive trade of that nation. But if such right be conceded to one nation, it must be conceded to all, and the impossible position results in which every nation endeavors to control and direct every trade that passes through its own ports, therefore, of necessity, the trade that passes through the ports of other nations. If commerce is thus hampered it is the producers and consumers who will suffer without any possibility of gain to the shipowners of any flag. The true basis of international commerce is the freedom of the seas, which can only be achieved so long as all ships have equal opportunities in all ports. It is a melancholy reflection, but the greatest obstacles in the way of British commerce and British shipping are those imposed by our Allies in the late war. As a nation we find that we are expected, and rightly expected, to meet heavy obligations on the one hand, and, on the other hand, we are expected to forego financial obligations due to us, whilst we have to face formidable tariff walls against the entry of British goods into those countries, but I have every confidence that in the long run common-sense will prevail, and that with a full and frank exchange of views between all parties, that policy which is best for the common good of all must emerge. Restrictions on freedom in commerce are surely retrograde movements, and not progressive, and if the United States discriminate in their ports against vessels under other than their own flag, we would only be drifting back into the position which caused Mr. Lindsay in his "History of Merchant Shipping," published in 1874, to express:

"A feeling of amazement at the trouble our ancestors gave themselves to beggar their neighbors in the erroneous impression which too long prevailed that by their ruin our own prosperity could be most effectively achieved."

IMPORTANT AMALGAMATION

Following along the lines adopted by many large concerns that have found it mutually advantageous to merge their business interests, The Schaeffer & Budenberg Manufacturing Co., with works and general offices in Brooklyn, N. Y., announce their consolidation with the American Steam Gauge & Valve Mfg. Co., Boston, Mass.

These two companies, while operating as one, will continue the manufacture at their respective plants of their various instruments for measuring pressure, temperature, power, speed, etc. The Schaeffer & Budenberg Co. retains its full original title, while the American Steam Gauge & Valve Co., becomes a "Division" of the Schaeffer & Budenberg organization.

Friends of these old-established concerns will be glad to learn that no radical changes are to be made in their executive personnel. The factory line-up also, which in both cases embraces operatives of long training in highly specialized departments, remains undisturbed.

The history of these companies runs strikingly parallel. The Schaeffer & Budenberg Mfg. Co., was founded in 1850, the American Steam Gauge & Valve Co., a year later. From their inception both companies have been actuated by one motive, to maintain their products at the highest standards. In the early days keen rivals in kindred lines, it is only logical that they should have eventually joined forces, for by this arrangement the manufacturing experience of both is advantageously combined, to the benefit of their joint clientele.

Probably no other single concern has contributed so much to the development of instruments for the promotion of efficiency in the power plant and manufacturing departments as the Schaeffer & Budenberg Mfg. Co. For more than three-quarters of a century this concern has been engaged in the manufacture of thermometers (indicating and recording), gauges, gauge testers, tachometers, counters, calorimeters, temperature controllers, and other instruments which have played an important part in the advancement of processes covering a broad technical field.

No less interesting than the history of the Schaeffer & Budenberg Mfg. Co., is that of the American Steam Gauge & Valve Co. In 1851, when steam as motive power was still in its infancy, the American Steam Gauge & Valve Co., began the manufacture of a few steam specialties. At its head were practical steam men who grasped the needs of the steam engineering world and who, by anticipating them, soon came to be looked upon as authorities in the domain of steam specialties.

The "American" line was expanded from time to time. To-day the company's plant is the largest of its kind and its products embrace a wide range of specialties, including gauges, gauge testers, engine indicators, steam traps, pop safety and water relief valves, thermometers, oil and grease extractors, etc.

Montreal.—A new grain elevator is to be built at Tarte Pier, costing $2,347,000, with an initial capacity of 2,000,000 bushels, to be ultimately increased to 8,000,000 bushels, according to the announcement of the Minister of Marine and Fisheries. Other improvements to the harbor, including extension of piers, and railways, improvement of channel and construction of a new bridge, are to cost in excess of four and a half million dollars.

Campbellton, N. B.—The shipping season from this port has established a record for recent years and a similar activity is evidenced as far as Bathurst and the Miramichi Valley. Most of the steamers at the port have been engaged in clearing lumber held during the war period, but further opportunities for the lumber industry are confidently expected to follow.

PERSONAL

Mr. H. N. McMaster, lately with the Montreal Transportation Co., and Canada Steamship Lines, has now started in business on his own account as vessel and insurance broker, consulting master mariner, marine surveyor, appraiser, etc., with offices at 285 Beaver Hall Hill, Montreal.

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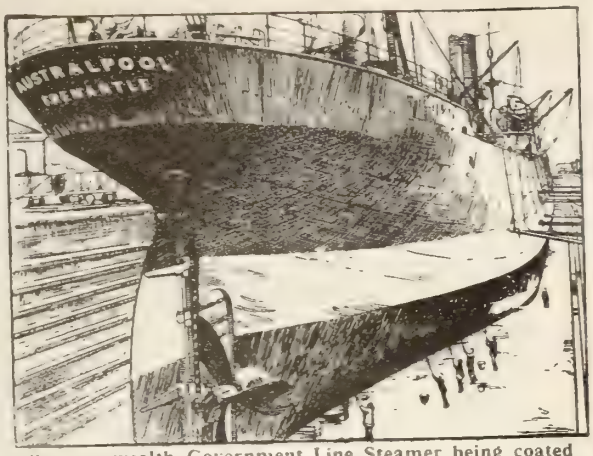

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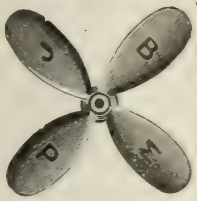

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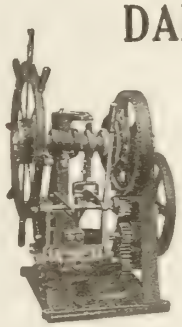

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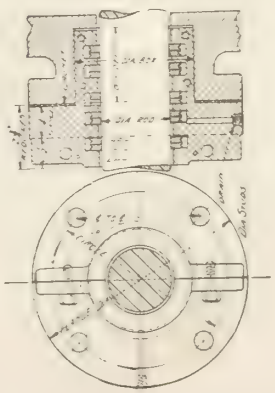

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Marine News From Every Source

Kingston:—Owners of coasting steamers and schooners available for the coal trade have received orders to have their vessels in readiness to transport coal from tide water to Kingston and other lake ports. This means that the coal from abroad is now coming in.

Welland:—At the banquet given to members of the Deep Waterways Association in this city on September 20, Mr. W. M. German, M.P., stated that the entire cost of the deepening of the river can be paid for by the sale of power. This statement was supported by Mr. O. E. Fleming, the president of the Association.

Cleveland:—The grain rate for the last half of November, from the head of Lake Superior and storage at Buffalo, was raised 5 cents recently, and the increased price brought out offers of tonnage freely. A fair amount of this tonnage has been lined up for the last trip and storage.

Montreal:—The Furness Withy steamer "Comino" which left port on Friday morning and stranded a short time later, about a mile and a half below Varennes was lightered over the following week end, September 16th to 18th inclusive, and the steamer returned to Montreal on the 19th. It was found by the Port Warden who inspected the steamer, that practically no damage had been sustained and the cargo was reloaded and she continued on her voyage to Hull.

Montreal:—Forty members of the American Association of Port Authorities, which concluded its annual convention on Saturday, September 16th, at Toronto, arrived in Montreal on Sunday evening, on the Canada Steamship Line's steamer "Rapids Queen." Monday, September 18th, was spent in a tour of inspection of the Port of Montreal. The party was conducted about the port by Mr. M. P. Fennell, general manager of the port and the newly elected president of the association.

Montreal:—The Harbor Commissioners have decided to double the charges for grain stored in elevators No. 1 and 2 for a period longer than thirty days. This action was taken in order to prevent the port grain elevators from becoming choked with grain not required for immediate shipment. The ruling is to be effective on and after September 20th and the rate on grain stored after this date will be one-half of one cent per bushel for each succeeding term of ten days following the first ten days of free storage. The old rate was one-quarter of a cent per bushel applied in the same way. The new rate will apply on grain already stored in the elevators as well as that received in the future, with the exception of that received for winter storage. The reason that the move was taken, it was stated on Sept. 11th, was that for the past three months grain exporters have been utilizing the port transfer elevators for storage purposes, and that it is in order to compel them to use the elevators for the purpose for which they were built, that the rates have been increased. In view of the big increase in grain traffic through Montreal that will occur with the arrival of the Canadian crop, it was considered essential that the elevators should be cleared to permit of their full utilization.

Montreal:—Dr. W. L. McDougald, president of the Harbor Commissioners, announced on September 11th, the appointment of D. J. Perrault as Deputy Harbor Master of the Port of Montreal. Mr. Perrault, who is a well-known local pilot, and a member of the Montreal Pilot Association, fills the vacancy that has existed since the promotion last spring of Capt. J. F. Simmons, former deputy, to the position of Harbor Master on the retirement of that post of Capt. T. Bourassa.

The new Deputy Harbour Master is 42 years of age and brings to his new position a practical and intimate knowledge of local shipping conditions. He has spent the last 26 years as apprentice and certified pilot in guiding ocean steamers between Montreal and Quebec. His apprenticeship was commenced under the harbour commissioners and on gaining his certificate 14 years ago performed his first service as pilot on tramp steamers. He next served as special pilot for the Elder, Dempster Co. Ltd., and then for 4 years with the Canadian Pacific Steamships Ltd. For the last 12 months he has piloted ships of the Cunard, Anchor Donaldson, Cairn, Thomson and Rodgers, and Webb Line, serving on some of the largest ships entering the port of Montreal. The appointment as Deputy Harbour Master took effect September 12th.

New York:—There has been a great falling off in the number of immigrants landing at this port this year as compared with previous years. The number of passengers of all classes landing at Atlantic ports up to September 9th numbered 182,745, while for the same period last year the number arriving was 413,462.

Winnipeg:—There has been considerable complaint by Western grain exporters against the alleged discriminatory rates charged by lake vessels to Georgian Bay ports, compared to those charged to the American lower lake ports. It has been suggested that the coastwise laws should be suspended to allow American vessels to compete, according to reports from Western sources.

Cleveland:—Latest advices from Cleveland show that coal has been coming forward more freely, and the tonnage for the week ending September 17 was estimated at 1,000,000 tons.

Windsor:—The residents of Windsor are not pleased with the ferry service given them by the Detroit and Windsor Ferry Co., and the Windsor City Council have made a request to the Minister of Railways to operate a ferry in connection with the G.T.R. It is said that this request has been favorably considered, and boats may be running early in the New Year.

Montreal:—The first of the C.G.M.M. vessels to bring coal from South Wales, the "Canadian Conqueror" followed by a number of other vessels, both belonging to the C.G.M.M. and to her owners, arrived in Montreal recently.

Kingston:—The Sincennes McNaughton tug "Dupree" with two barges in tow developed boiler trouble when in the vicinity of the Ducks. The steamer "Easton," which was bound up from Montreal to Port Colborne, noticed the "Dupree" in trouble, and picked up her and her tows and took them into Kingston. The tug was put alongside the Canadian Locomotive Co. wharf, and repairs effected, allowing her to proceed in a short time.

Chicago:—There is danger of a strike of seamen on the lakes, to take effect on October 1st, and if this happens it will seriously affect the delivery of coal to the western lake ports. Probably 65 per cent. of lake traffic would be tied up if the strike goes into effect, and the aim of the U. S. fuel administrator to unload 1,000,000 tons per week will be effectually blocked.

Welland:—The Deep Waterways and Power Association held their third annual convention in this city recently, and

W. Gerard Power, Chairman.
Charles Smith, Sec.-Treas.

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General Tremblay, D.S.O., Commissioner.
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it was well attended, about one hundred members being present. The new locks on the Welland Canal were visited, and it was pointed out that these were the type of locks intended to be built on the St. Lawrence canals, if the deep waterway scheme is passed.

Port Arthur:—The Northern Navigation liner "Hamonic" was badly damaged shortly before her sailing time through her being run into by the grain elevating ship "Robert L. Fryer." Fortunately the damage was above the water line, and after repairs had been executed by the Port Arthur Shipbuilding Co. the "Hamonic" was able to proceed.

Cobourg:—The sum of $27,500 has been appropriated by the Dominion Government for the purpose of deepening the harbor at this port, in order to facilitate coal deliveries during the coming winter. The work, which will be carried on under the inspection of Capt. A. McCaig, government inspector, will be done by the Frontenac Dredging Co., which has been awarded the contract.

Montreal:—The Donnelly Wrecking Co. successfully floated the steamer "Rapids Prince" from the ledge in the Lachine Rapids, on which she was stranded in July last. She was on the ledge for a period of about six weeks. It was stated that she was not very badly damaged, but would not be put in service again this season.

St. Catharines:—The tug "John L. Russell" crashed into the gates of the Welland Canal at Lock 15, and carried away three gates before her rush could be checked, besides damaging another one badly. Strangely enough, the same tug under another name, performed the same feat about one year ago. The repairs on the gates took about thirty-six hours in each case.

Detroit:—The new three and a half million dollar vessels of the Detroit and Cleveland Navigation Co. will be ready for service in the spring of 1924, according to reports. These vessels will be the largest steamships on the Great Lakes, and will have a length of 550 feet, beam of 100 feet, and will each contain 650 staterooms. The hulls will be built at Lorain, Ohio, and after launching will be towed to Detroit to have their machinery fitted.

Hamilton:—An interesting debate took place in this city on Sept. 15th, between J. H. Duthie and Senator Lynch Staunton on the Deep Waterway Scheme. J. H. Duthie as the founder of the Association upheld the merits of the scheme, while Senator Lynch Staunton opposed him. Each speaker had an hour in which to set forth his views, and no decision was arrived at, the object being to acquaint the public with the facts of the case from both sides.

Toronto:—The steamer "Chippewa" of the Canada Steamship Lines, had to abandon her trip to Niagara on Sept. 13th owing to some minor engine trouble which developed just as she left the dock. Two tugs were promptly on hand to haul her back to her berth, and the passengers were transferred to the "Cayuga."

Montreal:—The inquiry into the collision between the French steamer "Indochine" and the Danish steamer "Sarmatia" was concluded recently and Captain L. E. Demers, Dominion Wreck Commissioner, handed down his finding on Sept. 6th. J. B. Angers, pilot of the "Indochine" was found in default and his license was suspended for a period of six months of navigation. The period of suspension is to date from Aug. 24th, 1922, to July 24th, 1923. In addition to this suspension, the pilot was warned that should he again appear before the court and be found in default the question of revoking his license would be seriously considered. Considerable surprise was evinced by the court when it was learned that Capt. Albert Ducamin of the "Indochine" was not on deck at the time of the accident. His seamanship was also questioned on account of his action in withdrawing the "Indochine" from the "Sarmatia" subsequent to the collision. The poor visibility existing on the night of the collision was not taken as a direct cause of the accident.

The "Sarmatia" was exonerated from all blame.

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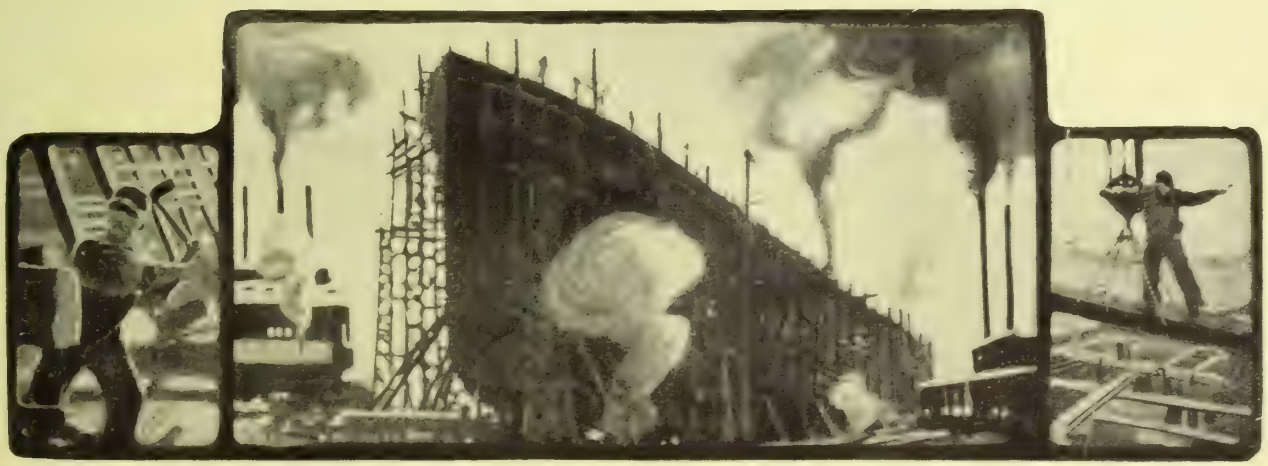

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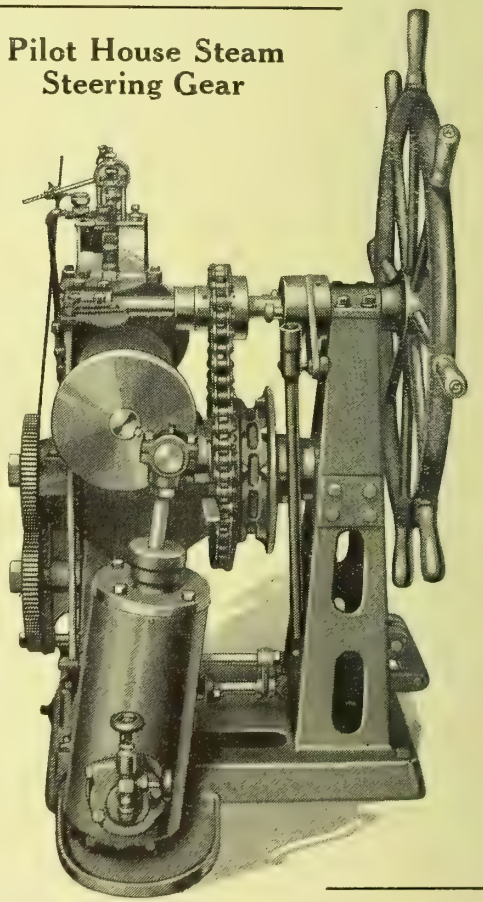

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Current News of The Ancient Colony

Special To "Canadian Shipping"

H. M. S. "Raleigh" as she was

NEWFOUNDLAND, since its discovery by John Cabot on the 24th day of June, 1497, has been a country of many exploitations, some of forest, some of minerals, many of fish; for it is upon fish that the Ancient Colony depends for its independence. And independence is the keynote of the whole sentiment of the populace. Confederation with the Dominion of Canada has been mooted time and again by politicians, but the sturdy islanders have no desire whatever to unite their fortunes—or misfortunes, as the case may be—with her big sister across Cabot Strait. Confederation is a bugbear which has been advanced by professional politicians, pro and con, as a lever upon which to hang their aspirations to hypothetical positions in the Canadian government, and as a fulcrum to boost and elevate their all too insecure condition in society; but the people will have none of it, and confederation with Canada in the island of Newfoundland at the moment does not cut any ice whatever.

But this is digressing from the story, which as our friend Rudyard Kipling would say, is another, to be told later. The object of this article, or the subject, whichever pleases, is to tell of the wonderful prospects of development that are in store for this colony.

The Humber Proposition

Here we have the great big issue, in other words the gigantic problem of elucidation in the matter of unemployment, of which there is a great deal in Newfoundland to-day. The government assures the people that by the passage of this act of incorporation, there will not be an idle person in the whole island. But there are pessimists; those who do not believe in the inducements held out; and these, of course, help to extend public opinion and cause it to become hostile to any project calling for, or asking, a government guarantee. To any person who has traveled by the Newfoundland Railway, from Port aux Basques to Grand Falls, there comes a vision of development along the line traversed that should have a culmination in huge plants and great buildings for the further carrying on of the one industry which dominates the world, that of the preparation and manufacture of paper.

Its Effect on Shipping

Should the Humber proposition become accepted by the government and people of Newfoundland, and the affair become a real proposition there is no doubt that the west coast of Newfoundland would become a centre of shipping second to none in the Maritime Provinces. The port of Humbermouth, in the Bay of Islands, has no equal in Newfoundland, and ships of all tonnages and displacements can easily approach its piers and docks. Being a terminus of the Reid Newfoundland Railway, for both trains and ships, it stands to reason that the navigable waterways would have been selected for safety of approach. And so it is with Humbermouth, the last word in marine convenience in the island of fame and history. Here the great river, with its manifold attractions to those disciples of Isaac Walton, who care to whip its streams and steadies, eases its flow of living waters into Humber Arm, which in turn carries it into the Bay of Islands, immortalized in song and story by the thousands who have had the splendid opportunity of being conveyed over its magnificent surface in sail or steam or motor craft. And so, should the Humber project go through, there will be a new discovery of Newfoundland. The question, however, and its success lies in the lap of the politicians, who are the titular deities of the ancient colony.

Deepwater Transportation Via Newfoundland

Accompanying the Humber project and almost as a corollary to it, comes another company with ambitions of shortening the ferry service across the Atlantic, both for passengers and freight. This company proposes the

The Aerial Survey Co's Building at Hawke Bay

construction of a short line of railway, with facilities for taking up whole trains of freight cars, and conveying them, holus bolus across an isthmus formed by the divisions of Placentia and Trinity Bays and reloading them on specially equipped steamers, without removing the contents until they reach the other side. This scheme is a huge one, and its success will depend much on the ability of the company to put their plans into operation. That it will mean an increase in shipping goes without saying, but, unluckily, we have had too many chimerical schemes proposed for Newfoundland, which never materialized, to place too great a credence in the prospects of eventuation.

South Coast Project for Development

And yet another syndicate comes forward with an idea to turn the hitherto unfruitful south coast into a region that will blossom like the rose. Steamers are promised in galore to take away the products that will be forthcoming by this company. New railway lines are to be constructed, special boats built, and thousands of people employed, once this new development gets going. But that too rests in the lap of the gods, yclept politicians. Taking the various propositions all in all, there is sufficient enterprise afoot to make Newfoundland one of the richest countries of the world. But the old idiomatic saying, often applied by our fishermen to ventures of this sort, "Live horse and you shall have oats" appears to be borne out in many instances, and possibly these we have mentioned might become part and parcel of numerous schemes which "went agley."

H. M. S. Raleigh

The Admiralty have at length decided to abandon this cruiser, which as already reported in "Canadian Shipping" went ashort at Port Amour, Straits of Belle Isle, some time ago. All the guns, fittings, etc., have been removed, and everything valuable was salved by His Majesty's Ships Calcutta and Wisteria. Anything that now remains of the hull and contents may be taken by the "livyers" and used for themselves. So passes a famous ship with a no less famous name. The illustration herewith was the very last taken of the Raleigh before her unfortunate end; on the same day she left Hawke Harbor on her cruise to circumnavigate the island.

Aerial Survey Company

This is one of the newly formed companies referred to in the headline as having become an actuality. Its general manager is Major Sydney F. Cotton, who is one of the foremost aeronauts of the age, and who on two springs at the icefields has attempted to locate the main patch of seals by aeroplane. Reference as to the difficulty of locating Cotton's Patch, last spring has been already made in these columns. This will not, however, deter Major Cotton from making another attempt next spring after the sealing fleet has made a start from St. John's. For the present he is engaged in looking after and attending to the interests of the Aerial Survey Company's properties and output at Hawke Bay. The photograph illustrating this article is an unique one, showing S. S. Home of the Reid Newfoundland Company's Coastal Service lying at anchor in Hawke Harbor, with the Survey Company's motor yacht Pixie alongside, taking freight for shore. The plant and offices of the company are shown in the background. Big things may be expected of the Aerial Survey operations in the district of St. Barbe.

Fish Steamer Leaking

Of late years it has been the custom of Newfoundland codfish exporters to get away big cargoes in steamers, with the preference, unpatriotically, to those of foreign register. Local sailing vessels, of which this colony possesses a large fleet, are necessarily laid up at their harbor moorings, because the fish interests prefer the foreign steamer. One of the latter, and there are a number under charter, came to grief a little while ago when making the harbor of Bark Tickle, Labrador, when she took ground, which necessitated her coming on to St. John's for docking and survey. Though the damages to the bottom are neither extensive nor serious, as she took the shoal very lightly and at nearly high tide, the delay in getting her fish cargo to market with other complications will not make the venture a profitable one for her charterers. But then there is ever a fly in the ointment.

QUICK REPAIR JOB

ONE of the large liners plying between European ports and Montreal had the misfortune recently to run aground in the St. Lawrence. She was soon released and docked at one of the large docks on the river. On a Thursday evening it was found that a number of large plates were damaged and would have to be replaced. A well known firm in Montreal was called on the phone and asked to procure about twenty plates 7/8 in. thick, by twenty feet long, by six feet wide. Phone calls all over Canada and the adjoining points in the States failed to locate the plates. Friday afternoon late, definite dimensions, and the number of plates required were phoned to the steel merchants. They in turned phoned a steel mill 19 miles outside Philadelphia and over the long distance wire prevailed upon the mill to roll these plates to special order on Saturday morning. Sunday and Monday morning were occupied by submitting the steel to the two score physical and chemical tests required by Lloyds for A No. 1 classification.

Meanwhile the steamship company had, in conjunction with the steel merchants arranged with the Pennsylvania Railway System to have a car ready to load the steel and a special locomotive to pull it into Philadelphia. The steel plates constituted a full carload lot. The car of plates left the steel mill early Monday afternoon, and as soon as they reached Philadelphia, were put on a through train to New York. Here the car was handed over to the Delaware and Hudson Railway who were induced to give the car special dispatch. The car arrived in Montreal at noon on Wednesday and was handed over to the Canadian National, who were able to switch the car into the drydock siding very early Thursday morning. The old plates had been removed, and were used as templates to lay off the new plates. Drilling and punching of holes, shearing, etc., commenced at once and the plates were rivited on Friday.

This service cost much less than express and was quite as rapid, if not more so. The estimated daily loss to the liner was $5,000 which goes to show the urgency of the situation.

TO FIGHT CORROSION

A leading British steel maker recently estimated that rust and other kinds of corrosion cost the world five hundred million pounds every year. This figure may be no more than a clever guess, but in any case the ravages of corrosion are so great that we are not surprised to learn that in Great Britain a proposal has arisen for the formation of an association of manufacturers of products which are non-corrodible and anti-corrosive. Support has been received from British firms making stainless steel, anti-corrosive paints, and various preservative compounds. The first step which this association of non-corrodible and anti-corrosive products will take is likely to be the organization of a public exhibition in London of non-corrodible and anti-corrosive products.

DOCK DEVELOPMENTS IN GREAT BRITAIN

Although several new schemes of harbor development in Great Britain have recently been recorded, the list is not yet completed. Steps will shortly be taken to carry out an important scheme for an ocean dock near Falmouth, Cornwall. This scheme was approved by the British parliament in 1919, and a syndicate has now been formed to secure the necessary capital. The site chosen is an ideal one for ocean steamers, as it gives a deep water approach and there are no strong currents. The first stage of the proposed dock works will consist of a quay nearly four thousand feet in length with railway connections and stores. Tidal basins and graving docks will be undertaken later. At Southampton, plans are in preparation for the construction of the largest floating dock in the world. It will be equipped with hydraulically-operated horizontal supports which can be adjusted to any size of vessel. The electric pumps for emptying the docks will be of seventeen hundred horse power and will raise a ship in four hours.

News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

OWING to the feeling among Quebec shipping interests that there is discrimination against their port, there is a movement on foot to attempt to induce the new Canadian National management to take over the port of Quebec. The idea is that they would then equip it, and use it in conjunction with the National Railways. The Canadian Northern, Quebec and Lake St. John, Quebec and Saguenay, and the Intercolonial Railway all have terminals in Quebec. As the Federal Government owns the waterfront from Champlain Market to the Quebec Bridge, about six miles in length, with all the buildings thereon, this plan would not be difficult of accomplishment. The plans that the Laurier Government had in mind when these lands were purchased, included the building of grain elevators and all necessary equipment for a harbor, but these plans were cancelled on the advent of the Borden Government in 1911. It is now proposed that the Canadian National Railways take over the land, complete the plans of the Laurier Government, and put a line of freight and passenger steamers to serve the railway system. This it is felt would be active competition to the C. P. R. both on land and sea. In addition it would offer competition to U. S. ports for world trade. It is pointed out by those interested, that eventually the Canadian National will have to be supplemented with a steamship line to connect with European countries, and if Quebec was in a position to serve this trade it would greatly enhance the value of the people's property. Even if the railways are eventually handed back to private interests the port property would be valuable. In addition to the property at the west end of the harbour, there is the Louise Dock at the east end under the administration of the Quebec Harbor Commission. These docks are equipped with railway tracks, immigration sheds, freight sheds, and grain elevators, all of the very latest construction.

There is accommodation at these docks for twenty-two ocean steamers. It is felt if this were also taken over by the C. N. R. that Quebec could be made the best equipped as well as the largest inland shipping port in the world. The future of Canada depends upon its commerce, and will be what its commercial men make it. As shipping trade goes wherever there are the best facilities to serve it, port facilities should be constantly in advance of existing business, in this way gaining more business all the time. Commerce has to be sought not awaited, and this has been appreciated by the commercial interests of the U. S. where every available port has been developed to a point well ahead of present requirements.

The National Railways in conjunction with a national passenger and freight service, using the port of Quebec during the summer and St. John and Halifax in the winter, would in a few years become as important and prosperous as the C. P. R. There can be no disputing the fact, that had it not been for the war, the population of Canada would today be twelve millions, instead of a little over eight, and this influx of immigrants would have called for better facilities than exist at present.

Port Authorities Visit Quebec

Last month about thirty members of the American Association of Port Authorities paid a visit to Quebec, and during their short stay were shown over the harbor and the Louise Docks. They expressed surprise that a port of such importance in size, and with adequate depth of water, was not more used by shipping. Mr. McCloskey, Secretary and Assistant Manager of the Port of New Orleans, one of the delegates, prolonged his visit to one week. During that time he made a thorough investigation of the port, and expressed the opinion that discrimination against such a fine port was a tragedy. He said he could not understand how it was that neither American nor Canadian grain was shipped through the port, neither could he understand steamship owners allowing their vessels to pass such a well equipped port, and proceed up an artificial channel to Montreal, incurring considerable delay in so doing. He said that the ports in the U. S. were directed along lines of even distribution of commerce in accordance with the size and importance of the section of the country where they were located. In the movement of grain for export, care was taken that there would be no congestion at any place, and the distribution was made with this in view.

Harbor Works

The Harbor Commission are in the meantime carrying on important works in connection with the Louise Docks which will improve the docking and landing facilities of passengers arriving by the C. P. R. Empresses. The docking berth of the Empresses at the Louise Breakwater, while convenient for the cabin passengers, was a long way from the immigration sheds, and caused a good deal of inconvenience, especially in inclement weather. The C. P. R. officials approached the Harbor Commission with a view to having this remedied, and in compliance the authorities are carrying out dredging operations which will allow the vessels to berth inside the breakwater. The first and second class passengers will disembark in shed 28 where trains will be drawn up on sidings ready for them, and the third class passengers will be able to proceed by a covered bridge which is being built to lead direct to the inspection sheds. The new arrangement will be more convenient all round, and result in a saving of time, as well as an increase of comfort to passengers of all classes.

C. G. M. M. Vessels

The question of the selling of some thirty of the war built government steamers, is being considered with interest by shipping men favorable to the present administration. These gentlemen claim that the C. G. M. M. should be immediately divorced from the Canadian National Railway management, and be given to a committee of experienced and practical steamship men to administer. It is argued that the C. G. M. M. has been managed in a slipshod manner, not through the fault of the manager, who had to submit all his plans to the C. N. R. executive, but by there having been too many bosses. It is said that part of the reason for the enormous deficit is that the ships were sent to foreign ports in ballast, without even being certain of a cargo when they got there, while ships chartered on this side to carry cargoes abroad, had not been fixed for return cargoes before leaving. Just as soon as Sir Henry Thornton returns to take over the general management of the C. N. R. the final disposal of the C. G. M. M. will no doubt be made.

Among other suggestions as to the final disposal of the ships one is to the effect that the Transcontinental Railway should be given more attention, and the C.G.M.M. ships be used to export grains brought into Quebec over the rails of the T. R. This would give the Grand Trunk Pacific an all Canadian route from the prairies to Europe and the United Kingdom, and by the addition of four large ocean passenger steamers making Quebec their terminus, would give active competition to the private owned railroad and steamers.

RECEIVES ORDERS FOR TUGS

Mr. Walter Lambert, the well-known naval architect of Montreal, has recently received instructions to prepare plans and specifications for two steel tugs for American interests. These tugs will be for service in American waters when completed.

Notes From St. John, N. B.

The month of September showed an increase over the number of vessels in harbor as compared with the same month last year. In 1921 six steamers and fourteen schooners entered, and this year twenty-one steamers and four sailing vessels.

The harbor returns for September were $4,830 as compared with $4,580 for the corresponding month in 1921.

During the first week in October there were six three-masted schooners loading full cargoes of coal in United States for a local dealer and from all indications there appears no reason for grave concern over fuel shortage.

There are also various coal importations from the U. K.

Large quantities of laths are being exported by steamer to the U. S. A. and considerable lumber shipments are moving via the port.

Word of the formation of a new steamship line between St. John and Havana, Cuba, for the handling of all kinds of merchandise has been received here, and a schedule of sailings will probably be drawn up soon. The line will be known as the Brito Line, is to be operated by a Cuban company with head office in Cuba. The Palm, the first vessel of this line, will arrive here about Oct. 30, and will go on the route immediately. It is expected she will be followed by others and that a regular sailing schedule will be outlined soon. Messrs. J. T. Knight & Co. will be the local agents.

The proposed making of Shed No. 14 into a frost-proof warehouse for the storage of potatoes is being pushed as rapidly as possible under the direction of A. G. Tapley, engineer of the public works department, and it is hoped the shed will be in readiness in the first week in November.

The Canadian Government Merchant Marine have announced plans for a potato boat service from this port to the United States to commence Oct. 20, with the "Canadian Gunner" and to include the "Canadian Sapper" on the same route if business will warrant it. Sailings will depend on the co-operation of the farmers in the shipping of their potatoes.

The "Canadian Gunner" will arrive Oct. 20, and will make two or three trips to points in Long Island. Following this she will sail from here to Norfolk, Va., and points as far south as Jacksonville, Florida. If prospects then warrant the "Canadian Sapper" will be added to the service early in December; this addition would provide a fortnightly service.

* * * *

The Canadian Pacific Bay Service steamer "Empress," while enroute on her return trip from Digby to St. John, ran aground on the ledge at Black Point, Friday afternoon Sept. 29, at 5.22 o'clock.

The "Empress" was built in 1906 at Newcastle-on-the-Tyne and is 1,342 tons gross. The steamer was in command of Captain A. MacDonald.

The grounding occurred during a dense fog with a heavy sea running. About eight minutes after the accident the ship's boat was sent ashore for assistance and immediately the Furness line tug "Neptune" left for the scene of the accident.

The heavy sea would not permit the Neptune to go alongside the wreck, so the seventy-three passengers, mostly women and children, had to be transferred by lifeboat.

The "Neptune" made three trips to the city with the women and children passengers and at 10.55 p.m. all passengers were safe ashore without any serious mishaps.

The rescue work was exceptionally difficult on account of the heavy sea, and many of the passengers were helpless through sea sickness and fright.

During the rescue work the tugs "Margaret A. Hackett," "J. H. Hackett," mud hopper "Piper" and the government steamer "Aberdeen" came to the scene.

Several attempts to haul the "Empress" off at high tide were made without avail. At low tide it was found the steamer was resting on a ridge of rocks which had bent the hull in about four feet, for a distance of some twenty feet along the keel.

During one attempt to refloat the "Empress" an eleven inch hawser was snapped on the "Aberdeen." Finally a wooden cradle was built under the bow of the wreck, and was well greased; some of the ledge was then blasted away, and when the tide rose the stern of the "Empress," the bow of steamer settled into the cradle, the various tugs then attached hawsers, and gradually the "Empress," also under her own steam, was pulled astern into deep water.

The "Empress" then proceeded up the harbour under her own steam, accompanied by a tug, and docked in Market slip. The steamer was then pumped out, and the hull filled with concrete to stop the leaks, to enable the wreck to proceed to Halifax to undergo repairs on the drydock there.

Black Point, where the steamer stranded, is four miles southeast of the pier where the "Empress" was to have docked, is two miles from Mispec, and two miles west of Partridge Island.

The work of salvage was under the personal direction of Captain J. T. Walsh, marine superintendent of the C. P. R. The work was done by the St. John Dry Dock and Shipbuilding Co, under the management of Mr. F. M. Ross. This firm was given the contract to make the necessary repairs to permit the "Empress" to proceed to Halifax.

Captain A. MacDonald of the "Empress" is well known in the bay service and has been on the St. John-Digby route for ten years, during which time he has made an enviable record, and his misfortune will be regretted by all who know him.

* * * *

Manchester, Mass.—Coila III, flying the colors of the Northern Yacht Club of Great Britain, lifted the Sewanahawka Cup recently, defeating the defender, Lakie, of the Manchester Yacht Club, in the third race of the series between six metre boats, sailed off this port. The British yacht won three consecutive races in as many days.

As a result of the victory the Coila III will take back to Glasgow the vase given 27 years ago by the Sewanahawka Corinthian Yacht Club, Oyster Bay, for the encouragement of small boat racing, the first time the trophy has been won by a vessel other than American.

The Coila III is owned by F. J. Stephens of the Royal Yacht Club, of Glasgow.

"Empress" on the rocks at Black Point.

Captain J. T. Walsh arrived in the city from Montreal to direct the salvage operations on the C. P. R. steamer "Empress."

Mr. Wilson N. Snider who was assistant lightkeeper to the late Frank Frauley, has been promoted to light keeper of the fog alarm at Lepreaux.

Alfred C. Currie, local agent for the Eastern Steamship Lines, Inc., returned from Boston, and advises that from the present indications the S. S. Governor Dingley will be withdrawn from the St. John-Boston service about the last of October.

The C. P. R. advise they have secured the government steamship "Aranmore" to temporarily replace the "Empress" on the St. John-Digby service until repairs are completed on the latter vessel.

* * * *

St. John's, Nfld., Oct. 2.—Three fishermen of Placentia Bay, contend they discovered the submerged hull of the Cape Breton steamer "Morien" which left Louisburg on Nov. 16, 1919, with a cargo of coal for Placentia, and was never heard of afterwards. It was believed the ship was lost on the Nests near St. Bridges, Nfld., and it is in this vicinity the wreck has been located. It is said the hull can be observed on the bottom on a clear day.

* * * *

Boston, Oct. 5.—The British schooner "Acadia" last night was homeward bound for Sydney, N. S., in ballast, having been released by the U. S. Government to her owner, E. R. Parsons, Lunenburg, N. S., but 557 cases of Scotch liquors, which reposed in her hold when she left St. Pierre Miquelon on August 14th, remained in the custody of the appraiser of the port.

The "Acadia" was captured off the Gloucester coast by the coastguard cutter "Ossipee" when she was alleged to have been attempting to land liquor.

The following are the arrivals and sailings, etc., of steamers at the Port of St. John, Sept. 12 to October 12:

"Vandreuil" from Sydney, C. B., to load liquor.

"Cardiff" discharged cargo coal.

"Wye Tempest" discharged cargo coal.

"Arnoy" discharged cargo coal.

"Nyhaven" discharged cargo coal.

"Gefion" loaded potatoes for Cuba.

"Commercial Scout" loaded potatoes for Cuba.

"Wimbleton" loaded cargo lumber.

"Cissy" inward cargo sugar for refinery.

"Berlin" inward cargo sugar for refinery.

"Eastern Tempest" loaded cargo sugar for Hull and Newcastle.

"Albiston" loaded cargo potatoes for Cuba.

"Norwega" loaded part cargo flour and sugar, Norwegian ports.

"Norefjord" loaded sugar for Christiana, Norway, (1,000 tons sugar).

"Anna" loaded potatoes for Cuba.

Oct. 13.—The court of enquiry into the stranding of the "Empress" consisted of Capt. L. A. Demers; Capt. A. J. Mulcahy and Capt. Parker. J. F. Rowan was secretary.

Capt. Angus MacDonald of the "Empress" was reprimanded but his certificate was not dealt with. The chief officer of the ship was also reprimanded.

Messrs. R. P. and W. F. Starr Ltd., have chartered nine schooners to load hard coal at New York for St. John. They are the "Peter McIntyre," the "Cynthia," "J. Griffin," "Harry H. McLellan," "Seaman A. O.," the "St. Clair Therriault," the "C. Maude Gaskell," the "W. M. Reinhardt," and the "Frances Parsons."

The steamer Coban, which is engaged in the coal carrying trade from Parrsboro to St. John, is making quite a record, landing at St. John about 14,000 tons of coal a week.

The Canadian Pacific Liner Empress, which recently went ashore in the Bay of Fundy, is being repaired at the Halifax Shipyards. Temporary repairs were made at St. John to enable the steamer to come to Halifax under her own steam.

The crew of the Yarmouth fresh halibuting vessel, Lewis H. Smith, suffered from lack of provisions during a recent trip to the Banks. The vessel put into Halifax on Oct. 13 with her mainsail split and supplies of provisions and gasoline exhausted. For two days the crew had only fried halibut and a limited supply of water. The vessel hailed for 25,000 pounds of fresh halibut.

Captain T. A. Hill, the popular and well-known commander of the R. M. S. P. Liner Chaleur, has been promoted to a larger steamer and has left for England. Captain T. J. C. Buret has taken command of the Chaleur.

The Tern schooner A. & W. Ogilvie, has changed hands several times recently. She was exchanged in trade by Captain Medley Blenkhorn for the Mina Nadeau and several days later was purchased by Captain James E. George of Parrsboro.

The Tern schooner Beaver, while bound for Gaspe to Boston with a cargo of lumber, was partly dismasted in a heavy blow off Halifax early in October and towed into this port. She had her mainmast and mizzentopmast carried away and also sprang a leak. The Beaver is quite an old craft and as a consequence was condemned. Her cargo was taken to Boston by the schooner Ethlyn.

Another Tern schooner to meet with mishaps on the Nova Scotia coast this month was the Favonian, also bound from Gaspe to New York with lumber. She had her headsails carried away in a gale one hundred miles east of Halifax. Repairs were made here and she resumed her voyage.

Up to the end of September a total of 134,829 barrels of apples had been shipped through the Port of Halifax to the markets of the United Kingdom. The Nova Scotia 1922-23 apple export season has got away to a record start; for the same period last year only 69,249 barrels were shipped. Last season the United States and Western Canadian apple crops were failures and the bulk of the early apple crop of Nova Scotia was sent to these markets. This year the crops in these districts were good, so that the Bluenose apple exporter had only the markets of the United Kingdom to cater to.

A two-masted schooner of 100 tons was launched this month from the yards of the Cochrane Shipbuilding Company,

Halifax Notes

ACCORDING to the winter schedule of the trans-Atlantic passenger lines out of Canadian ports, the Port of Halifax will receive a good share of passenger traffic during the coming winter season, which is expected to open towards the end of November. The schedules of the White Star, Dominion, Cunard and Anchor lines require about thirty calls here westbound and an equal number eastbound for their steamers. Practically all the ships under these ensigns, which have been in the St. Lawrence service during the summer, will visit Halifax during the coming winter.

Halifax also expects a good share of the freight to be exported through Canada's winter ports and although schedules of cargo-carrying liners have not been announced, a large number of sailings from this port is expected during the coming season.

During October, Halifax's biggest attraction was the Nova Scotia Fisherman's race and thousands witnessed the Champion Bluenose annex another victory on Oct. 7. Unfavorable weather prevented the second race being sailed so it was agreed that in order to allow the Canadian Defender sufficient time to make ready at Gloucester for the International, the one should constitute this year's series. Next year the International Series will be sailed here.

The loss of the Gloucester fishing vessel Marshal Foch, which occurred on October 11, was deeply regretted here. The vessel had visited this port on many occasions and had only left for the Banks two days before she stranded on the sands of Sable Island. The majority of her crew were Nova Scotian. They passed through Halifax on their way back to Gloucester.

Fox River, N. S., and is to be engaged in the lumber carrying trade between Nova Scotia Ports and Boston.

While awaiting a cargo of bricks at Avonport the schooner Abbie Verna was so badly strained that she was abandoned by her crew and since has been stripped. She is now a danger to navigation. She was recently purchased by William Patterson and John McGrath, Jr., and their loss is heavy. She was built at Waterborough, N. B., in 1898.

The four-masted schooner Cumberland Queen, which was built at Diligent River, was sold at Philadelphia early this month at Marshall's sale for $8,300 to satisfy claims for repairs.

The Red Cross Line are still maintaining their two steamers, the Silvia and Rosalind, on their New York-Halifax-St. John's service and while the passenger traffic has fallen off slightly a fair quantity of freight is available.

BRITISH SHIPBUILDING

"A number of contracts for shipbuilding have been placed recently, chiefly for United Kingdom ship-owners, and these are welcomed as signs of improving trade," stated F. W. Field, British Trade Commissioner, in an interview recently. "Not all the contracts, however, are for home waters, as it has recently been announced that a twin-screw steamer for passenger service between Wellington and Eastbourne (in New Zealand), and another for a tender service at Cherbourg, have been ordered from a Scottish shipyard. The former vessel will burn either coal or oil, and the second coal only. It is thought that the placing of these contracts indicates that the decreased cost of construction is having its effect on general trade.

"A large number of contracts for vessels of specialized kinds were held up during the war, and, although ship-owners still appear to be reluctant to pay the price demanded by the shipbuilders, specialized ships are still being ordered. The time will shortly come when, owing to the effect of trade revival and the general lowering in costs which is taking place, the market will again be in a healthy position.

"Reports to hand from Bombay state that two vessels built by the shipyard referred to above for trade on the west coast of India have reached their destination after successful runs from this country. These boats are only 390 tons gross, and their machinery consists of crude oil engines of 200 horse-power constructed by Beardmore & Company. In order to reach Bombay they undertook the voyage of 6,700 miles under their own power. In the course of that voyage they had a ten-days' non-stop run through the Mediterranean, during three days of which a very heavy gale prevailed. That they both accomplished the voyage safely is a high tribute to the vessels and their machinery.

"A specially interesting vessel is to be built for owners on the north-east coast by another Scottish shipyard. This ship will be built on the Arch principle, otherwise known as the Ayre-Ballard system of hull construction. The first vessel built on this principle was completed in 1910, and proved on service that she had the advantages claimed by the designers of economy in material. The economy is said to amount to about twelve per cent. of steel used, and the design lends itself to the adoption of wide cargo hatchways, exceptional cleanliness of hulls, and the self-tripping of cargoes.

"A large oil tanker which is being built to the order of the British Tanker Company, London, was launched by Swan, Hunter and Wigham Richardson from Newcastle-on-Tyne during August. This vessel will carry 10,000 tons of oil, and is being constructed to the highest class in Lloyds' Register. Besides the new constructional work, of which the above is given as representing only typical examples, there has been a greater briskness in repair work in various parts of the country. This is due to several causes, amongst them being the increased carrying trade necessitated to supply American contracts caused by the coal strike in that country."

A New Depth Finder

To determine the depth of water beneath a ship in uncharted seas or waters the lead and line is probably the most usual instrument. An improvement on this was the sounding instrument devised by Sir William Thompson, afterwards Lord Kelvin. A report from the office of H. M. Trade Commissioner at Toronto, states that a new step in progress is the optical depth finder described as Burn's continuous depth finder. This comprises a sluice valve, from which is directed a powerful beam of light from the bottom of the ship. The particular construction used permits the observer to clear the glass should it become obscured, while there is a safety mechanism should the glass become broken from any cause. The beam of light is projected vertically on the sea bed, while further along the ship the observer can note the angle at which the spot of light on the bottom appears. Operating a lever, the observer picks up the reflected light in an angle finder, and thus the depth of the sea bottom is indicated on a scale calibrated according to the distance between the observer and the light ray in the vertical tube. When the valve and angle finder are 100 feet apart a depth of about 96 fathoms can be recorded. An advantage claimed for this apparatus which will be fairly obvious, is that the operation of depth finding is independent of the speed at which the vessel is proceeding.

Satisfactory Record of a British Ferry Boat

John I. Thornycroft & Co., Ltd., have recently notified the Department of Overseas Trade, London, of the removal of a motor-propelled tandem-screw passenger vessel, built by them in 1908, from the ferry service on the Pahang River in the Federated Malay States. This particular service has recently been given up owing to the construction of roads in that area rendering passenger service by water unnecessary, and this boat is therefore being employed in other directions. It is interesting to note that in the Surveyor-General's report on the vessel in the last month or two, she is described as "in good running order and condition."

This ferry boat, called the "Tungu Miriam," has been operated throughout by natives, and her service has been recorded as most economical, easily enabling her to compete with steam vessels of the same character in cost of maintenance and the number of hands required. She is 55 feet long on the water line, 9 feet beam, and draws 15 inches. In addition to passengers she has cargo capacity for about 4 tons. The engine is one of the well-known Thornycroft C/6 type, its cylinders developing 75 b. h. p. on paraffin, giving her a speed of 11 miles per hour.

The firm are fully justified in claiming that a total of over 14 years' continuous service, ending in a report as mentioned above, speaks extremely well for the design and construction of both hull and machinery. The capacity for long service shown by this vessel, together with economy in maintenance and capacity of running without the need for skilled labor, is a general characteristic of machinery made in the United Kingdom for use in tropical countries.

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BRITISH PORTS

(We are indebted to H. M. Trade Commissioner at Toronto, for the information regarding British ports, contained in the following article.)

Manchester Docks and Manchester Ship Canal

The Customs port of Manchester is situated in one of the greatest manufacturing and most densely populated districts in the world. Within a radius of 12 miles of the city there is a population of over 2½ millions, while it is also the nearest port to an area containing 7½ millions. The following figures indicate the populations within certain radii from the port:—

Within radius of 50 miles	8,800,000
Within radius of 75 miles	12,200,000
Within a radius of 100 miles	15,400,000

The principal imports into Manchester are cotton, grain, timber, tea, sugar, oil, provisions, fruit, ore, and nitrates. Chief among the exports are cotton and woollen goods, machinery, metals, hardware, and earthenware.

The Ship Canal is unquestionably one of the greatest engineering feats of modern times. The entrance to the canal is 19 miles from the bar at the mouth of the River Mersey. The access channel has been excavated to a depth of 10 feet below Liverpool Bay Datum.

The canal is 35½ miles in length, and the principal docks are in Manchester. A depth of 28 feet is maintained throughout the canal by dredging.

The bottom width at full depth is with a few exceptions, 120 feet.

There are three parallel locks at Eastham, forming three separate entrances, which are open to Estuary level whenever the tide rises more than 26 feet 2 inches above Liverpool Bay Datum. When the tide is below this level access and egress are obtained by means of the locks. The large lock is 600 feet by 80 feet, the intermediate lock 350 feet by 50 feet, and the small lock 150 feet by 30 feet. A vessel can be passed through the largest lock in eight minutes or less. The width of the Ship Canal at Eastham Locks is 315 feet. The lower sill of the large lock is 13 feet below Liverpool Bay Datum, the upper sills of all the large locks being 28 feet below normal water level.

The following are the most important of the numerous wharves along the canal:—

Eastham Lay-by: 1,500 feet long with a depth of 28 feet of water alongside, and provided with electrically driven sheer legs, capable of lifting 15 tons to a height of 100 feet above water level. The sheer legs are used for lifting and replacing tops of funnels or masts.

Ellesmere Port is the terminus of the Shropshire Union Railways and Canal Company, whose navigations extend to Chester, through Shropshire, and by junctions with other canals into North and South Staffordshire, etc. In addition to their docks, there is constructed a long length of wharfage facing the Ship Canal, which has 20 and 24 feet of water alongside.

Stuart Wharf: 437 feet long with a depth of 20 feet of water alongside.

Manchester Dry Docks Company's Works and Floating Pontoon Dock.—The pontoon is 300 feet in length by 70 feet in width, with 16 feet of water on the blocks, which are 3 feet 9 inches in height, capable of lifting vessels up to 4,000 tons burden.

Stanley Cement Works are situated on the south bank of the Ship Canal at Stanlow, near Ellesmere Port. Alongside the works is a deep water lay-bye and wharf on the Ship Canal available for ocean-going vessels. The works are occupied, and a large cement making plant has been established.

Stanlow Point: The Canal Company are constructing a dock on the River Mersey side of the canal, where cargoes of petroleum spirit and other dangerous fluids flashing below 73° Fahr., and petroleum, lubricating and other oils will be discharged. A subway will be provided with pipes and all other facilities for pumping the oil underneath the canal into tank installations which are being erected by the principal oil importing firms.

Weston Point Salt Works: Berthage accommodation for steamers up to 500 feet long, with 28 feet depth of water alongside.

Runcorn Lay-by abuts on the Ship Canal at Runcorn immediately below Runcorn Docks and is 1,500 feet in length with a depth of 28 feet of water alongside, and is fully equipped with coal tip, movable cranes, and other appliances for loading and discharging cargo.

Runcorn Docks belong to the Manchester Ship Canal Company and cover an area of 70 acres, of which the water space is 15 acres, while in addition there is a storage ground covering 77 acres. The docks include the tidal dock, the Alfred, Fenton, Arnold, Francis, and Old Docks, and are chiefly used for pottery materials, timber, roadstone, pig iron, grain, etc. Coal, salt, pitch, hardware, and earthenware are the chief exports. The Bridgewater Canal runs inland from Runcorn, where the L. & N. W. Railway is in direct communication with the company's railways. The docks are well equipped with sidings, coal-tips, salt shoots, hydraulic and floating cranes, and other dock appliances. There is also a small graving dock belonging to the Ship Canal Company, for the repair of their own and, by arrangement, other small craft.

United Alkali Company's Wharves are 400 feet long, with a depth of water alongside of 26 feet, and 700 feet long with a depth of 22 feet.

Warrington Wharf, where large vessels can be loaded and discharged, is 300 feet long, while the depth of water generally available is 26 feet. The equipment includes a movable hydraulic transporter and a steam crane of a capacity of 30 cwt.

Rixton Junction: Junction with Mersey and Irwell Navigation; above this point the Ship Canal is a canalised river.

The Mana Company: Barge wharf.

Partington Coaling Basin and Lay-by.—Here is a quay space of 20 acres, with a length of nearly three quarters of a mile, water space of 6½ acres, and 22½ miles of railway sidings, together with accommodation for seven tips, six of which are constructed and in use. The tips are fitted with hydraulic machinery and all the latest improvements for loading coal; each tip has a capacity of 300 tons per hour. The equipment includes 9 locomotives and 2 steam cranes, and there is direct railway communication with all the coalfields of the kingdom.

Irlam Wharf is 300 feet long and 50 feet wide, with 24 feet of water, and is connected with the Manchester Docks by means of the Ship Canal Company's railways.

Flixton Wharf: For coastwise cattle trade.

Barton Oil Wharf: For the discharge of oil in bulk to the tanks of the Shell-Mex, Ltd., the British Petroleum Co., Ltd., and Meade-King, Robinson & Co., Ltd.

Irwell Park Wharf, Eccles, is 1,000 feet long, with 28 feet of water, for the discharge of pit props, timber, ore, etc., and cargoes consigned by rail to inland towns. The equipment includes 6 electric grab cranes of a capacity of 5 tons each (fitted with Priestner's grabs for the unloading of iron ore).

Peerless Oil Wharf: For the discharge of oil in bulk to the tanks of the British Petroleum Co., Ltd.

Coaling Crane: Hydraulic coaling crane (for cargoes and bunkers), situated on the north bank of the canal below Mode Wheel Locks, capable of manipulating 12-ton wagons with end doors only. Depth of water alongside, 22 feet.

Coastwise Cattle Wharves, with pens 252 feet long, divided into three sorting yards 84 feet by 15 feet 6 inches, and six pens 42 feet by 10 feet. Cattle can be transferred (day or night) direct from steamer through the sorting yards and pens into railway trucks, or driven by road to the adjacent Salford Cattle Market.

Weaste Wharf: 150 feet long, 50 feet wide, with 26 feet depth of water alongside.

Union Cold Storage Company's Refrigerator Store, with wharf alongside for berthage of large steamers, and connected with the company's railway system.

Mode Wheel Oil Wharves: For the discharge of oil in bulk to the tanks of the Anglo-American Oil Co., Ltd., Liverpool Storage Co., Ltd., and the Manchester Corporation. Depth of water alongside, 28 feet.

Animals Landing Place: Accommodating 1,850 cattle and 1,500 sheep.

Mode Wheel Locks, forming the entrance to the Manchester Docks, are 600 feet by 65 feet, and 350 feet by 45 feet. The width of Ship Canal below the lock is 320 feet. The total rise from the level of a tide rising 26 feet 2 inches above Liverpool Bay Datum to the level of the water at Manchester (70 feet above mean sea level) is 58 feet 6 inches.

The Manchester Docks.—The Dock Estate covers an area of 406½ acres, including a water space of 120 acres, and quays 6½ miles in length. The quay and storage area is 286½ acres in extent.

The dimensions of the docks, etc., are:

No. 1.—700 feet by 120 feet.
No. 2.—600 by 150 feet.
No. 3.—600 by 150 feet.
No. 4.—560 by 150 feet.
No. 5.—Not constructed.
No. 6.—850 by 225 feet.
No. 8.—1,160 by 225 feet.
No. 8.—1,340 by 250 feet.
No. 9.—2.700 by 250 feet.
Trafford Wharf—Length 2,500 feet.
Salford Quay.—Length 1,198 feet.

The Equipment of the Port.—The equipment includes:—53 hydraulic, 73 steam, and 130 electric cranes, with a radius of from 16 to 40 feet, capable of lifting from 1 to 7 tons to a height from rail level of from 13 to 80 feet; 6 electric grab cranes of a capacity of 5 tons each (fitted with Priestman grabs); a 30 ton steam crane; a pontoon sheers

(Continued on page 18)

THE RULING of Attorney-General Daugherty, of the United States Government, that transportation or sale of alcoholic liquors on American ships anywhere and on foreign vessels within three miles of the United States is illegal, has dominated the discussion of shipping affairs on the Pacific coast during the last few days.

* * * *

The fears of the American ports of Seattle, Portland and Tacoma that they are likely to lose important trade connections as a result of the ruling are exceeded only by the hopes of Vancouver, Victoria and Prince Rupert that they will gain as a result of the anticipated diversion of foreign ships from the American Northwest ports to Canadian waters.

* * * *

The Japanese lines are the principal foreign concerns that will be affected by the Daugherty decision, and already there has been serious consideration of plans to eliminate the customary call at Seattle and Tacoma and concentrate on Victoria and Vancouver, so that the passengers carried on their steamships may be accommodated in their desire for beverages more potent than ginger ale and lemonade.

* * * *

It is the general expectation, however, that the Seattle and Tacoma calls will not be affected, but that the foreign steamships will load and discharge their liquor stocks at either Victoria or Vancouver, where such arrangements could be easily made through the British Columbia liquor board, which is in charge of all liquor sales in the province. Victoria would probably be given preference in such an arrangement, as it would be fairly convenient for the steamships plying to and fro from Puget Sound ports to call in at Victoria on their way. This is already done by most of the lines.

* * * *

Increasing use of the Panama Canal by Eastern Canadian manufacturers in developing business with British Columbia is being urged by shipping and wholesale interests in Vancouver and Victoria. It is argued that the cost of shipping freight by way of the Panama Canal is so much cheaper than by rail that, except in a few commodities, it is by far the most desirable means of transportation. The shipipng men who support this idea are suggesting that Eastern Canadian manufacturers arrange to ship by steamship through Panama Canal once a month instead of once a week by rail. They point out that on articles such as pianos, the freight charges by rail are just about five times what they are on steamships sailing through the canal and that, except in special cases, the early delivery offered by the railroads, is not an essential consideration. They would prefer to wait three or four weeks and pay five times less in freight rates. Such an arrangement would have advantages other than those appearing at once on the surface, because it would provide an inducement to ship operators to place their tonnage at the disposal of eastbound shippers. There is always plenty of cargo offering in British Columbia for Atlantic seaboard, but the ever-present difficulty has been to secure sufficient space. In the past there has been so little freight routed from east to west by the Panama Canal that it has not been worth while to send ships out. Ship operators claim that it is not worth while to send out ships for eastbound freight unless they are able to book at least 3,000 tons of cargo for the west. During the first six months of this year 148,000 tons of miscellaneous cargo passed through the canal from the United States to British Columbia. Practically all this business could have gone to Eastern Canadian houses if they took advantage of the canal route.

* * * *

Vancouver has now definitely established itself as a grain port of real importance, and bookings of prairie wheat through Vancouver destined for the United Kingdom and Japan have grown enormously this year. Equalization of freight rates, which has been fought for strenuously by the provincial government and the coast shipping interests for years, is expected to hasten the movement, and plans are now being advanced for the establishment of elevators and shipping facilities of far greater capacity than are at present at the disposal of the port. It is evident that Vancouver will not be without competition in this new movement of Canadian grain to the Pacific coast, as Portland, the leading wheat port of the American Pacific seaboard, is now reaching out for a share of the Canadian trade. At present the rail rate between Calgary and Portland is 53½ cents, while the rate between Calgary and Vancouver is 41½ cents. The distance from the Alberta city to Portland is 696 miles and to Vancouver, 641 miles. Portland interests claim that the Canadian Pacific Railway should offer a lower rate.

* * * *

Victoria business interests are pressing for the establishment of a new ferry service between Port Angeles and Victoria to accommodate motor tourists traveling to and from Vancouver Island and the Washington state mainland. The Canadian Pacific Railway Coast Services are planning construction of a ferry steamer to run between some Vancouver Island port and the mainland at New Westminster, Stevenston or Vancouver, and this will operate in addition to the new ferry steamer being built for the service, construction to be started in Seattle almost immediately under the direction of Capt. Harry W. Crosby.

* * * *

Effective December 9, with the sailing of the liner President Jefferson from Seattle and Victoria, the Admiral Line will establish a twelve-day service to the Orient. A semi-monthly schedule has been maintained in the past with a fleet of five United States Shipping Board liners. The quicker service will be made possible by reducing the period of lay-over in Seattle.

* * * *

W. H. Snell, of the Canadian Pacific passenger agency service, has taken charge of the Vancouver office of the company. He was formerly in the Montreal office.

* * * *

The Blue Funnel (Holt) Steamship Line will soon place two of its largest and finest steamships in the Pacific trade, according to advices received here recently. The Achilles will leave Liverpool late this year for these waters, to be followed shortly afterwards by the Philocototes, of the same type as the Achilles. The Achilles will come here by way of Hong Kong, leaving that port December 5 for Victoria. When the new ships reach the Pacific the Blue Funnel Line will have four of its largest vessels in the service between here and the Orient, the Tyndareus and Protesilaus being the other ships.

Dan Hanlen, of San Francisco, has converted the steamship Homer into a deep-sea wrecker and stationed her off Port Angeles. It is expected that the California operator intends to compete with the Victoria salvage companies, which have enjoyed virtually a monopoly for several years.

* * * *

The Canadian Government Merchant Marine has found it advisable to again deny reports that it is contemplating the removal of its three vessels, Canadian Farmer, Canadian Rover and Canadian Observer from the California run. The company reports that they have been operated on a profitable basis and that the addition of a 4,000-ton vessel to the same service is being considered.

* * * *

Vancouver expects to almost double its trade this winter and this hope has been strengthened during the last few days by reports that Japan will take a large proportion of the wheat shipped west of the Rockies. Already Japan has placed orders for 2,000 tons for November shipment and this is taken as a distinctly favorable sign. Last year Vancouver handled 7,400,000 bushels of grain, but this was much less than could have been shipped through had the facilities been better. This winter, with improved elevator conditions, Vancouver expects to put through at least 15,000,000 bushels, and an active campaign for still better storage and shipping arrangements, as well as for lower rail freight rates, is now being prosecuted with a view to putting the port on a par with Eastern grain shipping centres. The proximity of Vancouver to the Oriental market, which is buying an increasing amount of grain from this continent every year, the advantage of open water transport all the year round and the cheapness of the Panama Canal route are all factors strongly favoring Vancouver, as well as the nearness of the wheat fields of Alberta and Saskatchewan. Manchuria and Australia have had good crops, but the Canadian wheat is needed for blending purposes in the manufacture of flour.

* * * *

W. G. Winterburn, M.I.N.A., Victoria consulting engineer and naval architect, who represented the Bureau Veritas on the Canadian Pacific coast during the period of active shipbuilding, has been elected a vice-president of the British Institute of Marine Engineers.

* * * *

The Federal Government has confirmed the appointment of Robert Lennie, chairman; E. A. James and John Fife, all of Vancouver, to act as a conciliation board in the dispute between the Canadian Pacific's British Columbia lake and river navigation service and certain employees, members of the Canadian Navigators' Federation, British Columbia section of the National Association of Marine Engineers. The fifty-five men concerned directly in the dispute, although about 1,250 men composing the crews of the lake and river vessels are indirectly affected. Amendment to wage schedules and working conditions are the cause of the controversy.

* * * *

Japanese interests, said to be the Mitsui Company, are contemplating the purchase of the steel steamships City of Victoria and City of Vancouver, built by the J. Coughlan shipyards of Vancouver, and now laid up at False Creek.

* * * *

Announcement that construction of a training wall 4,100 feet in length in Woodward's channel, near Stevenston, will be undertaken shortly is accepted as an indication that the Federal Government is planning a comprehensive scheme for the improvement of the main channel of the Fraser River. The training wall project will cost about $100,000. The jetty at the sandheads of the Fraser will also be completed soon.

* * * *

Alex. Johnson, deputy minister of marine and fisheries, made a recent visit to British Columbia ports. He said there was a good prospect of an early settlement of the claims of the creditors of the defunct Prince Rupert Drydock and Construction Company. A settlement of fifty cents on the dollar is being considered.

* * * *

The Port of Victoria had an unusual visitor recently when the sixty-nine-foot Chinese junk Amoy, commanded by Captain George Ward, arrived after a 91-day voyage across the Pacific. Capt. Ward, who is a naturalized Canadian had a sudden desire after living some years in China to return to Canada and he chose to make the long voyage in a junk constructed under his own direction and manned by himself and a crew of three native river boatmen. He was accompanied by his Chinese wife and twelve year old son. Although the tiny craft ran into a typhoon and rough weather in the northern Pacific, no serious mishap was encountered. The junk is now headed for the Atlantic coast and will be exhibited at Coney Island.

* * * *

The Lochgoil, a new motorship launched in August at the Harland and Wolff yards, will be added to the Pacific service of the Royal Mail Steam Packet Company. She is a twin-screw vessel of 9,500 tons.

* * * *

The Canadian Pacific Railway is contemplating the construction of a new dock in Vancouver, and President E. W. Beatty stated on his recent visit to the coast that, while the plans had been held up temporarily because of details connected with specifications and materials, a definite announcement as to the general features of the contract would be made known in the immediate future.

BRITISH HARBOR PROGRESS

An engineering visitor from the United States to Great Britain recently paid his testimonial to the excellence of the modern plant installed at British ports for the handling of coal and of ships' cargoes in general. The high standard of efficiency thus indicated is being shown in connection with the discharging and storing of grain. The Clyde, for example, now possesses one of the finest granaries, and there was recently installed a pneumatic suction grain elevator which has a capacity of one hundred tons of grain per hour. By means of this plant the grain is sucked up from the hold of the vessel and discharged direct into the store.

Montreal.—A despatch from London says that it is understood that a representative of the North Eastern Marine Engineering Company, Wallsend-on-Tyne, is about to go to Canada with a view to the establishment of a branch factory for the manufacture of marine engineering material in Eastern Canada.

Montreal.—Three world's records for unloading and loading grain have been broken at the port of Montreal during the last ten days. In one day 1,569,393 bushels of grain were loaded for sea, while 800,000 bushels were unloaded. This gives a total of 2 369,393 bushels moved in one day. Another world's record was broken for speed in unloading a vessel. A steamer arrived in port at 5.30 a. m., was berthed at 7 o'clock, delivery of grain was commenced at 8 o'clock and the vessel put out to sea the same evening with 242,000 bushels of grain in her hold.

By the close of the shipping season, the British Empire Steel Corporation will have shipped 700,000 tons of iron ore to Germany and established a market with the large steel plants there. Two blast furnaces are being operated and as soon as the St. Lawrence season closes, a third will be blown in. A moderate amount of export steel business has developed in addition to an improved domestic trade, and it is likely that railway demand for cars and other material will further contribute to the activity of the industry. According to the president, Roy Wolvin, the first half of the year was unsatisfactory, due to conditions in the steel industry, but general conditions had greatly improved.

Moose Jaw, Sask.—The Moose Jaw Board of Trade decided to make an attempt to have the express rates reduced.

After a discussion on the subject, the secretary of the local Board of Trade was instructed to communicate with the Associated Boards of Trade of Saskatchewan, asking that body to co-operate with the local Board of Trade in an effort to get the Board of Railway Commissioners to consider the reduction of express rates.

LLOYD'S REGISTER SHIPBUILDING RETURNS

For the Quarter ended June, 1922

LLOYD'S Register Shipbuilding Returns for the quarter ended September 30, show the merchant tonnage returned as under construction in the United Kingdom at the end of September amounts to 1,617,045 tons. This represents a reduction of about 302,000 tons as compared with the total at the end of the previous quarter.

The total includes a considerable amount of tonnage (419,000 tons) on which work has been suspended for some time. Deducting this amount in order to enable a comparison to be made with figures for normal times, the tonnage actually under construction in the United Kingdom now amounts to 1,198,000 tons. The average tonnage under construction during the twelve months immediately preceding the war was 1,890,000 tons, i.e., 692,000 tons more than the present figures.

As compared with the figures for the quarter ended June 30, there has been an increase in the tonnage launched and in the tonnage commenced in the United Kingdom during the past quarter, the tonnage of vessels launched being 158,346 tons and of those commenced 43,551 tons more. The total merchant tonnage building abroad is 1,085,511 tons, but this includes about 256,000 tons upon which work has been suspended, leaving about 829,000 tons actually under construction. It will be seen that the tonnage building abroad is about 230,000 tons lower than the total building at the end of June. The decrease affects most countries, but especially France, Holland and Italy. The figures for the leading countries abroad are: Italy, 210,114 tons; France, 197,065 tons; Holland, 177,024 tons; United States, 147,056 tons; and Japan, 96,897 tons.

The above figures do not take into account the tonnage building in Germany and at Danzig, for which no returns are available, but it is estimated that the tonnage under construction in Germany at the present time is about 350,000 tons, and at Danzig 40,000 tons.

From the table showing the number and tonnage of vessels launched in the world during the quarter under review, it will be seen that the total figures amount to 476,070 tons, of which 307,232 tons were launched in the United Kingdom and only 168,838 tons abroad. In addition to the above about 100,000 tons were launched in Germany and at Danzig, but, as previously stated, these figures are only approximate and are, therefore, not included in the tables. The tonnage commenced in the world during the same period amounted to 187,527 tons, of which 82,428 tons were commenced in the United Kingdom.

The returns show that there are at the present time 62 steamers and motor vessels, each of over 1,000 tons, with a total tonnage of 391,245 tons, under construction in the world for the carriage of oil in bulk. Of the total, 47 of 306,971 tons are under construction in the United Kingdom. The tonnage of vessels now building which are to be fitted with internal combustion engines amounts to 241,622 tons.

Of the total tonnage given as being under construction in the world—which total excludes vessels the construction of which has not actually been commenced and also all vessels of less than 100 tons—389 of 1,640,425 tons, or more than half, are under the inspection of the Society's Surveyors, with a view to classification in Lloyd's Register Book. In addition, 66,000 tons are being built to the Society's classification in Germany.

MERCHANT VESSELS UNDER CONSTRUCTION

The returns compiled by Lloyd's Register of Shipping, which take into account only vessels of 100 tons gross and upwards the construction of which has actually been commenced, show that there were 331 merchant vessels of 1,617,045 tons gross under construction in the United Kingdom at the close of the quarter ended September 30, 1922. The particulars of the vessels in question are as follows, similar details being given for the preceding quarter for the purpose of comparison:

Description	Sept. 30 1922		June 30 1922.	
	No.	Gross Tns	No.	Gross Tns
Steam				
Steel	296	1,487,696	347	1,787,158
Wood and Composite	2	1,202	2	1,202
Total	298	1,488,898	349	1,788,360
Motor				
Steel	25	126,092	30	128,789
Wood and Composite	2	345	2	345
Total	27	126,437	32	129,134
Sail				
Steel	6	1,710	9	2,010
Wood and Composite				
Total	6	1,710	9	2,010
Total Steam, Motor and Sail	331	1,617,045	390	1,919,504

The tonnage now under construction in the United Kingdom is about 302,000 tons less than that which was in hand at the end of last quarter, and about 1,666,000 tons less than the tonnage building 12 months ago.

These figures, however, do not represent the work actually in progress. The total now returned as under construction includes 419,000 tons on which work has been suspended, the work actually in hand being thus reduced to 1,198,000 tons.

Of the vessels being built in the United Kingdom at the end of September, as recorded in the above Table, 265 of 1,210,812 tons are under the inspection of the Surveyors of Lloyd's Register with a view to classification by this Society.

MERCHANT VESSELS UNDER CONSTRUCTION IN THE WORLD

Where Building		No.	Gross Tons
United Kingdom	*	298	1,488,898
	†	27	126,437
	‡	6	1,710
Other Countries	*	291	950,279
	†	72	115,185
	‡	48	20,047
Total for the World	*	589	2,439,177
	†	99	241,622
	‡	54	21,757

*Steam †Motor. ‡Sail.

The tonnage now under construction in Germany and at Danzig is estimated to be about 350,000 tons and 40,000 tons respectively. If these figures be added to the totals shown in the above Table, the grand total building in the world would appear to be about 3,093,000 tons.

Of the vessels being built in the world at the end of September, as recorded in the above table, which excludes vessels the construction of which has not actually been commenced and all vessels of less than 100 tons, 389 of 1,640,425 tons are under the inspection of the Society's Surveyors with a view to classification in Lloyd's Register Book. In addition 66,000 tons are being built to the Society's classification in Germany.

WORK IN HAND IN PRINCIPAL DISTRICTS

The following table gives the total figures for vessels now under construction in the principal shipbuilding districts of the country, as compared with those for the previous quarter. Each district of course includes places in the neighborhood of the port after which it is named.

District		Sept. 30, 1922 No.	Sept. 30, 1922 Gross Tonnage	June 30, 1922 No.	June 30, 1922 Gross Tonnage
Aberdeen	*	9	10,090	5	5,845
	†	1	140	1	140
Total		10	10,230	6	5,985
Barrow, Maryport and Workington	*	4	21,600	5	35,450
	†	—	——	1	6,998
Total		4	21,600	6	42,448
Belfast	*	22	242,780	25	274,110
Bristol	*	4	2,000	4	2,000
	†	2	5,104	3	7,408
Total		6	7,104	7	9,408
Clyde—					
Glasgow	*	57	361,664	72	459,821
	†	8	50,415	9	57,832
Total		65	412,079	81	517,653
Greenock	*	16	90,460	22	138,393
	†	4	30,000	3	24,300
Total		20	120,460	25	162,693
Dublin	*	2	1,045	2	1,045
Dundee	*	9	40,010	8	41,550

	†	1	7,700	1	7,700
Total..		10	47,710	9	49,250
Hartlepool	*	12	52,680	10	46,530
Hull	*	12	27,244	13	33,367
	†	2	330	4	757
Total..		14	27,574	17	34,124
Leith	*	4	16,440	6	20,070
	‡	1	250	1	250
Total..		5	16,690	7	20,320
Liverpool	*	12	55,950	18	62,120
	†	1	4,000	—	—
Total..		13	59,950	18	62,120
Londonderry		—	—	—	—
Middlesbro',	*	14	49,493	13	67,124
Stockton and	†	2	8,000	2	8,000
Whitby		—	—	—	—
Total..		16	57,493	15	75,124
Newcastle	*	58	338,561	64	374,604
	†	3	15,200	2	9,700
Total..		61	353,761	66	384,304
Newport, Mon.	*	2	7,080	5	10,046
Southampton	*	18	38,513	19	44,007
	†	2	325	3	879
	‡	1	600	1	600
Total..		21	39,438	23	45,486
Sunderland	*	19	110,913	25	138,591
	†	1	5,223	1	5,170
	‡	2	540	2	540
Total..		22	116,676	28	144,301

* Steam. † Motor. ‡ Sail.

The three tables which follow give further details of the work in United Kingdom and foreign yards. The fourth gives details of vessels commenced and launched during the quarter, and the last is an analysis of the size of steamers and motor vessels under construction abroad. It is of interest to note that at the end of September there were being built abroad 15 steamers and motor vessels, each of 1,000 tons and above with a total tonnage of 84,274, intended to carry oil in bulk. Of these 4 of 26,780 tons were being built in America, 4 of 23,000 tons in Italy, 3 of 17,710 tons in France, and 2 of 3,284 tons at Fiume. Holland and Japan were building one each.

NATIONALITY OF VESSELS

Country for which intended.	No.	Gross Tons
United Kingdom	252	1,227,433
Argentine	1	4,400
Belgium	4	11,260
Brazil	—	—
British Dominions	8	9,175
Chili	1	7,000
Denmark	1	4,850
France	13	78,450
Greece	1	4,100
Holland	10	121,200
Italy	1	18,017
Japan	2	12,600
Poland	—	—
Roumania	1	1,260
Norway	1	4,675
Spain	2	7,500
Sweden	1	5,223
United States	2	4,700
For Sale or Flag not stated	30	95,202
Total	331	1,617,045

SIZE OF VESSELS UNDER CONSTRUCTION

The following table shows the vessels under construction in the United Kingdom classified according to gross tonnage:—

Gross Tonnage	Number Steam	Motor	Sail
100 and under 500	41	5	5
500 and under 1,000	38	—	1
1,000 and under 2,000	34	1	—
2,000 and under 3,000	11	2	—
3,000 and under 4,000	14		
4,000 and under 5,000	18	4	
5,000 and under 6,000	33	5	
6,000 and under 8,000	55	7	
8,000 and under 10,000	24	3	—
10,000 and under 12,000	4	—	—
12,000 and under 15,000	8	—	—
15,000 and under 20,000	13	—	—
20,000 and under 25,000	4	—	—
25,000 and under 30,000	1	—	—
30,000 and under 40,000	—	—	—
40,000 tons and above..	—	—	—
Total	298	27	6

MERCHANT VESSELS UNDER CONSTRUCTION ABROAD

Countries	Steamers & Motor Vessels Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Sailing Vessels Steel No.	Steel Gross Tons	Wood No.	Wood Gross Tons	Total No.	Total Gross Tons
United States:										
Atlantic Coast	22	75,956	1	800	9	7,500				
Gulf Ports	—	—	—	—	—	—	—	—		
Pacific Coast	4	16,500	—	—	—	—	—	—		
Great Lakes	6	46,300	—	—	—	—	—	—		
									42	147,056
British Dominions:										
Australia	4	20,500	—	—	—	—	—	—		
Canada:										
Great Lakes	—	—	—	—	—	—	—	—		
Coast	5	5,950	—	—	—	—	3	1,855		
Hong Kong	2	9,750	—	—	—	—	—	—		
Others	2	2,500	—	—	—	—	—	—		
									16	40,555
Belgium	9	14,872	—	—	—	—	—	—	9	14,872
Brazil	1	2,170	—	—	—	—	—	—	1	2,170
China	3	2,300	—	—	1	350	—	—	4	2,650
Denmark	17	39,00	2	930	—	—	—	—	19	39,930
Esthonia	1	567	4	810	—	—	9	2,900	14	4,277
Fiume District	5	6,099	2	340	—	—	—	—	7	6,439
France	42	196,465	—	—	1	600	—	—	43	197,065
Holland	77	176,024	—	—	2	1,000	—	—	79	177,024
Italy	37	199,674	18	7,468	—	—	14	2,972	69	210,114
Japan	27	96,897	—	—	—	—	—	—	27	96,897
Norway	31	44,391	1	115	—	—	—	—	32	44,506
Portugal	—	—	5	2,943	—	—	6	2,350	11	5,293
Spain	16	50,767	—	—	—	—	1	150	17	50,917
Sweden	16	44,436	3	940	—	—	2	370	21	45,746
Total	327	1,051,118	36	14,346	13	9,450	35	10,597	411	1,085,511

The total tonnage building abroad includes about 256,000 tons upon which work is now suspended, the country mostly affected being Italy.

VESSELS COMMENCED AND VESSELS LAUNCHED DURING THE QUARTER

Countries	Commenced Steam No	Steam Tns Gr	Motor No	Motor Tns Gr	Sail No	Sail Tns Gr	Total No	Total Tns Gr	Launched Steam No	Steam Tns Gr	Motor No	Motor Tns Gr	Sail No	Sail Tns Gr	Total No	Total Tns Gr
U. K.	30	66,908	3	15,200	2	320	35	82,428	65	288,320	5	18,492	3	420	73	307,232
Belgium	4	970	3	.....	..	...	4	970	3	5,632	.	.....	..	...	3	5,632
Dominions	..	.....	..	.....	..	135	1	135	4	11,796	1	253	1	135	6	12,184
China	2	1,600	..	.....	..	...	2	1,600	1	700	.	...	1	360	2	1,050
Denmark	1	960	3	7,605	1	...	4	8,565	2	3,550	.	...	..	...	2	3,550
France	2	5,800	..	.....	1	...	2	5,800	4	9,665	.	...	1	600	5	10,265
Holland	..	.....	..	.....	1	800	1	800	8	24,881	1	1,800	..	...	9	26,681
Italy	..	.....	..	.....	..	...	.	.....	1	24,700	1	3,500	4	802	9	29,002
Japan	10	16,120	..	.....	..	...	10	16,120	8	19,020	.	...	.	...	8	19,020
Norway	5	6,689	..	.....	..	...	5	6,689	9	10,933	.	...	..	...	9	10,933
Portugal	..	.....	..	.....	..	...	..	.....	8	.....	1	600	5	1,660	6	2,260
Spain	..	.....	6	810	..	...	6	810	..	.....	.	.....	..	...	..	.....
Sweden	1	850	2	13,260	..	...	3	14,110	..	.....	4	9,970	1	270	5	10,240
U. S. A.	10	48,400	..	.....	2	1,100	12	49,500	9	37,421	.	.....	1	600	10	38,021
Total	65	148,297	14	36,875	6	2,355	85	187,527	117	436,618	13	34,615	17	4,837	147	476,070

In addition to the above it is estimated that about 100,000 tons were launched in Germany and at Danzig during the quarter, making a World total of about 576,000 tons.

SIZE OF STEAMERS AND MOTOR VESSELS UNDER CONSTRUCTION ABROAD

Country where Building.	Under 2,000 Tons	2,000 to 3,999	4,000 to 5,999	6,000 to 7,999	8,000 to 9,999	10,000 to 14,999	15,000 to 19,999	20,000 tons &over	total
Belgium	8	..	..	..	1	..	..	..	9
Dominion	7	4	..	1	..	1	..	..	13
Denmark	11	6	1	1	..	..	..	..	19
France	8	12	9	9	1	3	..	..	42
Holland	48	13	4	7	4	1	..	..	77
Italy	27	3	9	14	..	..	..	2	55
Japan	7	9	5	5	1	..	..	..	27
Norway	29	2	1	..	..	..	..	..	32
Spain	9	3	..	2	..	2	..	..	16
Sweden	11	3	3	2	..	..	..	.	19
U. S. A.	13	5	4	4	6	1	..	..	33
Others	20	1	..	..	..	..	..	..	21
Total	198	61	36	45	13	8	..	2	363

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Out-Volsteading Volstead

THE GOVERNMENT of the United States, still struggling in the paroxysms of attempted enforcement of the famous Volstead Act, wishes to alter International law for its own convenience. It, in effect, say with Omar,

"O could we take this sorry scheme of things entire,
And mould it nearer to our heart's desire"

and calmly proposes to the rest of the world that as far as the United States is concerned, the three mile limit shall be the twelve mile limit. It asks other nations to please allow the Revenue vessels of the United States Government to stop them on the high seas, whenever the Revenue officers see fit, for the purpose of being searched. If contraband is found aboard, the offending ship is to be confiscated. That is one phase of the liquor enforcement law. The next is that no ship of any nation shall enter a port of the United States if she is carrying alcoholic liquor, on pain of confiscation. This has been modified to exempt foreign vessels which had left their home port before this drastic order was promulgated. It was really framed in an effort to make vessels owned by the United States Government, and operated by one of its departments, obey the laws that were entrusted to another department to enforce. It is impossible to tell as yet just what effect it will eventually have.

In the meantime, the British Government has addressed very strong protests to the U. S. Government for their action in seizing a British ship outside the three mile limit, after the British Government had refused the naive request for permission to do that very thing. The situation has its serious side, as it is mainifestly impossible for the British Government to give up the right of its vessels to the high seas, and if the U. S. Government insist on infringing the rights of peaceable vessels belonging to another nation, there are all the elements that lead to tragedy.

It is rather a remarkable thing that in the effort to make all people moral by legislation the rights of everybody in general are ruthlessly disregarded. Of course, to the ardent prohibitionist, the main thing is that people shall not drink the liquors that he disapproves of. If the only way of ensuring this is to place them in a position where they will no longer be able to drink anything at all, he will look upon their cold corpse with a feeling that he has done well for the world. Looked upon from another point of view the antics of Uncle Sam under the sting of the smugglers of whisky and near whisky are nothing but funny. Gilbert and Sullivan, were they with us, would have a merry time, setting the [illegible] and disorders to appropriate words and music.

The Canadian ports of Vancouver, Victoria, Halifax and St. Johns as well as Montreal and Quebec are praying fervently that the U. S. will insist on debarring vessels which carry liquor. They recognise the fact that the majority of people who travel across the ocean are normal humans, who will not travel in ships where they cannot procure their accustomed beverages. This will mean a diversion of passenger traffic from U. S. ports to Canadian ports, with business for Canadian railways, hotels, ship chandlers, passenger agents, etc. As they would say in Montreal, "Vive la prohibition, pour les autres."

Quebec and Discrimination

OUR CORRESPONDENT in the city of Quebec, in his monthly letter, again voices the feeling of a number of residents in that city, that there is a conspiracy against their port in favor of Montreal. This is a very serious charge, and should not be made without the very soundest basis in fact. To us, as a disinterested onlooker, the charge does not seem well founded.

It is quite true, that if a shipowner makes one port his terminal, he is discriminating against all the other ports to which he might be able to send his ships. This discrimination is one that he cannot be blamed for exercising, and if he did not so wisely use it, would not remain long in business. The feeling in Quebec is that the shipping interests in Montreal are more in favor of giving business to United States ports than to the port down the river from them. Just what are these shipping interests of Montreal? Outside of the C. P. Steamships, practically every liner fleet using the St. Lawrence is owned outside of Canada, and the shipping firms in Canada merely act as agents for these lines. The C. P. steamships use both Montreal and Quebec, as their needs dictate, and in their peculiar position, are equally at home in either of these ports. The ships owned in England, which make Montreal their terminal, do so, without any question, because it is to their financial interest so to do. Their ships are run with one object in view, and that is to earn dividends for their shareholders, and in the management of them sentiments plays no part at all. If the owners found that they could make quicker and more profitable voyage by using Quebec instead of Montreal, they would immediately make arrangements to do so.

While we should like to see the port of Quebec filled with shipping all through the season of navigation, we feel that it is not by decrying their rivals in Montreal, and pointing out the dangers of the channel, that Quebecers will achieve their desire.

It is a strange thing how one's own interests, or what one thinks are one's interests, will change a view point. Here

(Continued on page 14)

Latest Movements of the C. G. M. M.

Steamer and Voyage	Sailed From	Arrived At	Sailed From	Arrived At	Oct. 16, 1922 Routed
Aviator (15)	Mont'l Aug. 24	Denia Oct. 12			Montl., Bari, Messina, Leghorn, Marseilles, Tarragona, Val'ncia, Denia.
Beaver (15)	Mont'l Oct. 12	Sydney Oct. 15			Mont., Sydney, Barbados, Demerara, Trinidad.
Britisher (3)	Vanc'r Oct. 6	Fraser Mills Oct. 12.			Vanc'r, Chemainus, Genoa Bay, Nanaimo, Fraser Mills.
Carrier (10)	Mont'l Sept. 26	Cardiff Oct. 9	Cardiff Oct. 13	Swansea Oct 14	Mont., Cardiff, Swansea.
Challenger (5)	Mont'l Sept. 30	Sydney Oct. 3	Sydney Oct. 7		Mont., Sydney, C.B. Australia, New Zealand.
Coaster (9)	Montreal Sept. 13		St. Kitts Oct. 9		Mont., Barbados, Trinidad, Demerara.
Command'r (9)	Mont'l Sept. 15	Immington Oct. 11			Mont., Quebec, London, Rotterdam.
Conqueror (8)	Mont'l. Sept. 9	Colon Oct. 2	Panama Oct. 3		Mont., Sydney, N.S., Brisbane.
Construct'r (2)	Montreal Aug. 24		Birkenhead Oct. 4	Psd. Fath. Pt. Oct. 15	Mont., London, Antwerp, Rotterdam, Mont.
Cruiser (3)			Montreal Sept. 25		
Explorer (6)	Montreal July 29		Newcastle Oct. 14		Mont., Sydney, Australia, N. Zealand.
Farmer (21)			Vancouver Oct. 13		
Fisher (15)	Mont'l Sept. 14	Bermuda Oct. 14	Bermuda Oct. 14		Montreal, Bermuda, Nassau, Kingston, Belize, Montreal.
Forester (15)	Montl 'Oct. 6	Bermuda Oct. 13	Bermuda Oct. 14		Montreal, Bermuda, Nassau, Kingston, Belize, Montreal.
Freighter (4)	Vanc'r Sept. 7	Yoko, hama Sept. 27	Yokohama Sept. 29		Vanc'r, Yokohama, Bombay, Pt. Sudan.
Gunner	Mont'l Sept. 13		St. Anne Oct. 12	Psd. Canso Island Oct. 14	Mont., Richibucto, St. Anne des Monts.
Harvester (10)	Mont'l Sept. 28	Barbados Oct. 12	Barbados Oct. 13		Montreal, Sydney, Barbados, Trinidad, Demerara.
Highlander (5)	Vanc'r May 31	Honolulu Sept. 30	Honolulu Oct. 5		Vanc'r, Victoria, Honolulu, Auckland, Sydney, Melb'rne, Adel'ide, Newcastle, Pt. Allen, Honolulu, Vancouver.
Hunter (11)	Mont'l Aug. 6	Lisbon Oct. 3	Lisbon Oct. 5	Psd. Cape Race Oct. 14	Mont., Sydney, Gibraltar, Barcelona, Patras, Messina, Tarragona, Denia, Valencia, Malaga, Lisbon, Montl.
Importer (6)	Vanc'r June 13	Saigon Sept. 30	Saigon Oct. 10		Vanc'r, Miike, Bombay, Madras, Bassein, Saignes, Cuba, via Triester.
Inventor (6)	Vanc'r Sept. 6	Shanghai Oct. 7			Vanc'r, Yokohama, Kobe, Shanghai.
Engineer	Goderich Oct. 8	Fort William Oct. 10	Fort William Oct. 11		Goderich, Ft. William, Goderich.
Leader (4)	Mont'l Oct. 11	Psd. Belle Isle Oct. 15			Mont., London.
Logger (7)			Mont'l Oct. 11		
Mariner (8)	Mont'l Oct. 5	Psd. Belle Isle Oct. 10			Mont., Liverpool, Glasgow.
Miller (12)	Mont'l Sept. 1	Glasgow Sept. 25	Glasgow Oct. 3	Psd. Father Pt. Oct. 16	Mont., Liverpool, Glasgow, Montreal.
Navigator (17)	Mont'l Sept. 1	Swansea Sept. 21	Swansea Oct. 7		Montreal, Cardiff, Swansea, Montreal.
Observer (23)	Vanc'r Sept. 29	Astoria Oct. 10	Astoria Oct. 10		Vanc'r, Blaineys, Oc. Falls, Astoria, San Pedro.
Otter (21)	Mont'l Sept. 30	Psd. Belle Isle Oct. 5			Mont., London.
Pathfinder	Midland Oct. 9	Fort William Oct. 11	Fort William Oct. 13		Midland, Fort William, Tiffin
Pioneer (9)			Montreal Oct. 7		
Planter (5)	Mont'l May 31	Panama Oct. 5	Colon Oct. 6	N. York Oct. 16	Mont., Sydney, Australia, N. Zealand, New York, Mont.
Prospector (8)	Vancouver Oct. 11				Vanc'r, Chemainus.
Ranger (17)	Mont'l Aug. 13	Quebec Oct. 10	Quebec Oct. 15	Mont'l Oct. 16	Mont., Quebec, Devonport London, Cardiff, Quebec, Montreal.
Rover (19)	Vanc'r Oct. 7	Oc. Falls Oct. 11			Vanc'r, Blaineys, Nanaimo, Oc. Falls.
Runner (11)			Montreal Oct. 7		
Sapper (32)	Mont'l Oct. 11	Charlottetown Oct. 14			Mont., Charlottetown, St. John's, Mont.

Latest Movements of the C. G. M. M.

Steamer and Voyage	Sailed From	Arrived At	Sailed From	Arrived At	Oct. 16, 1922 Routed
Scottish (3)	Vanc'r Sept. 8	Auckland Oct. 6	Auckland Oct. 11		Vanc'r, Auckland, Sydney.
Seigneur (14)	Mont'l Sept. 18		Birkenhead Oct. 13		Mont., Liverpool, Birkenhead, Garston.
Signaller	Mont'l Oct. 7	Baddeck Oct. 11			Mont., Baddeck.
Skirmisher (3)	Vanc'r July 13		Honolulu Oct. 12		Vanc'r, Sydney, Melb'rne, Adel'ide, Newcastle, Honolulu, S. Francisco.
Sower	Midland Oct. 14				Midland, Fort William.
Spinner (8)				Mont'l Oct. 10	
Squatter (10)				Mont'l Oct. 16	
Trader	Midland Oct. 15				Midland, Fort William.
Transp'rt'r (3)	Vanc'r Sept. 19	Honolulu Oct. 1			Vanc'r, Sydney.
Traveller (4)	Vanc'r Aug. 12	Adelaide Oct. 7			Vanc'r, Auckland, Sydney, Melb'rne, Adelaide.
Victor (8)	Mont'l July 4	Auckland Oct. 8	Auckland Oct. 13		Monl, Australia, New Zealand.
Volunteer (15)	Mont'l Oct. 14	Psd. Father Pt. Oct. 15			Mont., Cardiff, Swansea.
Warrior	Mont'l Sept. 8	Sydney Oct. 12	Sydney Oct. 12		St. Peters, Washabuck, Montreal, Baddeck, Sydney.
Winner (6)				Vanc'r Oct. 12	
Sheba	Mont'l Sept. 9	Little Bras d'Or Oct. 13			Mont., Little Bras d'Or.
Tolmie (2)	Vanc'r July 10	Newcastle Oct. 11			Vanc'r, Australia, N. Zealand.
Adventurer	Midland Oct. 15				Midland, Fort William.
Raider (12)	-	-	-		Montreal. May 16
Rancher (9)	-	-	-		Montreal. May 17
Trapper (12)	-	-	-		Montreal. June 23
Trooper (15)	-	-	-		Montreal. July 9
Sailor (17)	-	-	-		Goderich Dec. 4
Drummond (7)	-	-	-		Collingwood June 9
McKee (4)	-	-	-		Goderich Dec. 12.
Miner (18)	-	-	-		Halifax Nov. 25
Sealer (14)	-	-	-		Halifax Dec. 20
Settler (11)	-	-	-		Halifax Jan. 13
Voyageur (12)	-	-	-		Halifax Dec. 15

QUEBEC AND DISCRIMINATION

(Continued from page 12)

we have Quebec pointing a warning finger at the terrible risks to be encountered by vessels passing up the channel to Montreal, while on the other hand, we see Toronto, Duluth, Chicago and other lake ports in the middle of the continent clamoring for a deep waterway that will allow these same ships to take a further inland passage of a thousand miles or so, to the most inland ports there are.

Ports become great by reason of their geographical position, the facilities they afford shipping, and if these two conditions are right, nothing on earth can prevent them growing.

A NEW MOTOR FUEL

Many interests have been actively at work for some years in Great Britain on the attempt to discover a motor fuel which would be essentially cheaper than petrol. At least one of these efforts is likely to be crowned with success. A British distilling company recently announced that the experiments which the company had been carrying out for two years on the production of a motor fuel had yielded highly satisfactory results. This fuel is produced by mixing crude whisky with an extract from a vegetable of Indian origin. The mixture can be sold profitably at about one half the existing price of petrol. A mixing plant has already been set to work in London and is affording regular supplies of this new fuel to a limited number of customers. Further mixing plants are to be erected at Liverpool and Glasgow.

Montreal:—On October 11th the harbor of Montreal was giving accommodation to eighty-seven steamers, ocean and coasting, without counting the numerous Great Lake vessels in port at the same time. This exceeds the previous high record of September 7, 1921, when there was a total of eighty-seven vessels of all kinds. There is every indication that still higher records will be established, as there are a large number of vessels on their way to Montreal to load for Europe with grain.

* * * *

APPOINTMENTS TO C. G. M. M.

We have been notified by the Superintendent Engineer's Department of the Canadian Government Merchant Marine of the following appointments:

L. Lambert to be chief engineer of S. S. "Canadian Trader;" J. A. Crepeau to be chief engineer of S. S. "Canadian Sower;" J. M. Bowden to be chief engineer of S. S. "Canadian Sailor;" E. G. Rankin to be chief engineer of S. S. "Canadian Engineer;" W. P. Craig to be chief engineer of S. S. "Canadian Adventurer;" W. Lamb to be chief engineer of S. S. "Canadian Pathfinder;" G. V. Brown to be chief engineer of S. S. "Canadian Forester;" Wm. Geddie to be chief engineer of S. S. "Canadian Volunteer."

Relation of the Port to Production

In the Development of a Port Three Things Are Absolutely Essential—They Are Commercial Requirements, Public Spirit and Courage to Carry Out a Vision

By FREDERICK W. COWIE

FROM the earliest times the port has been recognized as one of the most vital factors in connection with the security, commercial success and national supremacy of the countries of the world.

In History and Art the port has been a frequent theme of description and illustration.

By a careful analysis of historical records it may be accepted that the port has ever developed the country, rather than being a result of actual commercial supremacy.

In modern times, the Port of London resulted in England's maritime supremacy. Hamburg, and her Free Port, not only developed in a few years Germany as a great maritime nation, but in addition, to a wonderful degree, stimulated production. The Erie Canal and New York Harbor did more towards the development of the United States, by opening up the great producing Middle West, than any other factor. The Port of Montreal is doing the same for Canada and the North-West.

If in the past the port has been a vital factor, in the future it will be even more so.

If in the past the port, as a receiving centre, became the warehousing, manufacturing and distributing agency, in the future the port will concentrate the products of the country, preserve them, re-manufacture, warehouse, market and ship to the direct advantage of the producer, and at the same time enrich her own people.

Of natural harbors there have been many, but of successful ports in natural harbors, few. Commerce in ancient times, and possibly traffic in modern times, have ever been essential. They are particularly requisite to-day, in the days of large volume and small profits.

Shipping and ports have developed in close relation. In early times, when ships were small and commerce limited, ports or harbors were merely places of shelter. Trade routes passed through the most convenient and best sheltered ports, without regard to facilities, shipping profits being so high as compared with tonnage. Ports were, however, improved in time, and facilities provided to suit the character of business.

The First Association of Merchants made the port for their own ships and their own commerce. Then when commerce became the life of the nation, the State found it necessary to assume authority.

As shipping increased and commerce progressed, improved port facilities were made necessary. Many a port which had reached a period of prestige and prosperity, but did not grasp changed conditions and new opportunities, has passed out of sight and lives only in history.

The establishment of trade routes and commercial connections is a matter of long and insistent effort. The labor of years, however, may be destroyed much more quickly, and when once dislodged, it is more than ever difficult of re-establishment.

As shipping merchants became prosperous they developed at successful ports markets for the exhibition, sale or exchange of their wares; later the warehouse, where their merchandise could be stored for safe keeping, and so as to be convenient for shipping when markets were favorable and shipping available.

In modern times, when the spirit of discovery spread throughout the world, maritime nations rose to pre-eminence. Nations and states appreciated the necessity of becoming interested in their commercial development. It was then realized that ports were of national consideration. Later, as in the case of nations, it became of first consideration for cities. Port cities prospered, the surrounding territory shared in the advantages, and, the value of a port being demonstrated, every enterprising community set itself out to develop a port.

The selection of the port location, in early times, when a safe shelter for ships was an essential requirement, rather than port facilities, resulted in the development of ports at the safest and most convenient harbors.

Modern volumes of trade, financial resources, construction methods, size of ships, value of time in port and transportation facilities, have in recent years resulted in the more successful artificial harbors on favorable trade routes and at financial and business centres. In fact, the old claim of being "ample for the navies of the world to swing at anchor" is now rarely advanced.

To co-operate with production, in its completest sense, for marketing, for collecting, for manufacturing and for shipping, is, in modern times, the spirit of the modern port.

It is a matter of record that commerce was not always directed according to the most economical or logical route. Influence or local enterprise has frequently resulted in commerce being conducted at fundamentally higher costs than otherwise possible. But somebody stands the loss. It is certainly not the merchant. It is probably not the consumer, as there is competition, and it must be a loss to the producer.

It must be admitted, as demonstrated, therefore, that the producer is vitally concerned in the port, not only as a port convenient for his trade, but as wisely located, economically administered and operated in his interests.

Three essentials have ever been present in connection with succesful port developments:—

Commercial requirements.

Public spirit.

Courage to carry out a vision.

Some ports were successful, many were not. The successful had the necessity, the men of public spirit and the men of courage.

Those unsuccessful may have had the same business necessity without the public spirited citizens, or without the courage to carry out their vision of what should be. In many cases there have been public spirited citizens of the most noble type who have sacrificed their energies to mistaken visions, business necessities not being available to back up their expectations.

In all cases, therefore, ports were developed with a view to expected returns to merchants, or prosperity to cities, or commercial greatness to nations.

Fundamentally, as commerce was created, ports were developed by merchants and ship owners, or by cities and nations.

Later came special commodity ports for bulk cargoes of coal, ore, timber, etc. These in many cases were built by special interests at their own cost, not being dependent on other commerce, and their location and type were only of interest to their owners.

Inland canal navigation not only aided in the development of the interior areas, but had also an important share in the building up of the ports. When, later, railways became such a tremendous factor and when transportation became a fact as well as a word, railways in their individual interests began to build ports at the termini of their main lines, without regard to general co-ordination or to national economy. Duplication resulted. The most valuable waterfront sites were held and not used to capacity. Terminal interchanges and lighterage added to port costs. The "railway" port development has not cheapened transportation, nor has it been attractive to ships.

Later still, industrial ports became necessary, with the same results, co-ordination and comprehensiveness not be-

ing the principles upon which they were designed.

For example, considering modern ports only:—

Market Ports.

London, Hamburg, Antwerp, Marseilles, Constantinople, Calcutta, etc., were built for merchants, shipowners and shipbuilders.

Bulk Cargo Ports.

Exemplified by Hull, Cardiff, Superior, Erie, Norfolk, Mobile, Pensacola, etc.

Industrial Ports.

Providence, Detroit, Philadelphia, Newcastle-on-Tyne, Manchester, Belfast, Bremen, etc.

Canal Ports.

Buffalo, New York, Montreal, Manchester, Antwerp, Hamburg, etc., all fortunately followed up and aided in development by railway transportation.

Railway Ports or Terminals.

In almost every city having waterfront, in duplicate, for each railroad.

In America the development of railways has evolved a nation of master minds. As a result of this genius, immense distances have been overcome, interior settlement made possible, and shipments to distant markets and all the benefits of the inter-change of products and even luxuries of the world made profitable.

Competition has resulted in splendid services, and at one time in cheap transportation. Railway building was necessary. It made the country but the building by each railway company of its own terminal at every point on the coast was a tremendous error on the part of the otherwise perfect team work of the competing railway corporations.

A port must fundamentally be comprehensive if it would be successful. To be comprehensive, the number must necessarily be few and the location logical with respect to trade routes, commercial necessities and producing or consuming areas.

A Port grouped in name only, and not by correlation, is only a slight improvement over distinctive units in the one city.

It cannot be expected that a single railroad will build a comprehensive port for the commerce of its rivals. A single city, however greatly to be benefited by the port, cannot be expected to finance a modern scheme which is national in its benefits. Coal, ore and other bulk freight interests require a distinct treatment, but even these interests, in most cases, may be handled economically and to advantage in a comprehensive port.

Ports have, therefore, been built and developed for almost every class of production. But who ever heard of a port for the farmer?

When it comes to agricultural produce, the vital factor, the life-giving blood of a nation, the necessity of a comprehensive port should be convincingly apparent. It is immediate in its results. It aids production and it cheapens food prices. It is a direct aid to agricultural production.

Ports have, therefore, been developed for large and important interests, and in a measure exclusively for those interests.

The modern port, to aid production, to aid the farmer and benefit the consumer, requiries a co-ordination of facilities that will result in a comprehensive port, concentrated as to distances and convenient as to location.

General cargo ships make a port successful. General cargo ships are attracted to a comprehensive port where ships may be loaded with general merchandise, with a supporting cargo of grain or other bulk freight, all loaded at one berth without delay and with economy in port and handling charges.

The comprehensive port is the port of the present time. It is a necessity for the farmer. It is reasonable that he should have it. It is a factor which will make for success rather than failure. If such a port is not provided for the farmer, what may be expected? He will undertake to provide it for himself, and possibly not along the best lines for other interests of the country.

The farmer has found that by co-operation he can build and own his own grain elevators. He operates them according to his own views, and to his own advantage. He gets satisfaction and he finds that it pays. It pays better than any other investment in which he can put his cash, if he has any, or credit, which he can usually obtain.

The Farmers' Country Elevator System has extended to the terminal elevator. Grain is only one of the products of the farmer. Port terminals and marketing facilities will be the next undertaking of the farmer, if not supplied by the nation or the state.

The co-operative marketing system is being found successful. Where will it lead to? Wise counsel and co-operation with the farmer would be for the general good.

A farmer has not the special training for the best success in all these special branches of commercial and business enterprises. The farmer would not think of it if he did not observe the success of many men with no more training, and without half as much energy and effort as is required for successful production, and especially if he were not aware of the difference between the prices he recieves and what the consumer pays.

Frankly, do you blame the farmer if he "takes matters into his own hands" to obtain what, rightly or wrongly, he considers is his just due?

The tragedy of it is, the certainty of a movement along wrong lines. A successful "buyer" is not born; he is made. He is the survival of the best of many who start and, by talent and industry, succeed.

The farmer understands that experience is required for both buying and selling. If, in the marketing process, his interests are safeguarded, he is satisfied. He fears the speculative buyer and he distrusts the middle man. His efforts to obtain his due share of the price paid by the consumer for his products are not, however, revolutionary. He knows that his demands are reasonable and if he is not given marketing and handling facilities which he considers proper for the handling of his products, the time is past for folding his hands.

Later on, organized labor will join the farmers' movement if the prices the consumer pays do not bear a proper relation to the price obtained by the farmer.

Why not anticipate the movement, which cannot be fully and properly developed by farmers, or others not specially trained along these special lines? Why not give the farmer the facilities he needs, the best possible price obtainable and the marketing and financial facilities which the country owes him for his life of hardship and isolation? Why not give organized labor cheaper necessities of life? Production is necessary, it should be aided; labor is necessary, it should be encouraged.

These are serious questions for port authorities, for transportation interests, for merchants, for exchanges, for boards of trade, for municipalities and for nations.

Aid to the farmer would in the end enrich the transportation interests by increasing the volume of freights. The merchants would have a larger turnover. There would be more business in all directions, and to the community the benefits would be general.

God knows, public ownership is fundamentally at odds with the principles upon which the world has prospered. But if there is one exception, it is the port. The port is, it must be, a community interest. If provided by the people, it is liable to furnish what is required. If operated under their direction it is likely to give satisfaction; duplication will be avoided; economy must result.

To be successful, a port must be comprehensive, co-ordinated and self-contained. A port designed in the country's interests may be built with the country's credit, and should be a credit to the country.

The ideal port stands for cheap transportation, careful handling, safe storage, marketing when prices are favorable and shipping when tonnage is available. It results in economy of time, space and condition.

This type of port will surely pay, because it will get the business. It fears not competition.

There must, however, be great care exercised on looking to the strategic position for the port. There must be business in view. The site must be ideally located, with regard to population and business centres. A distinct improvement on existing facilities is essential, or why undertake new ones? There have been many failures and only a few successes, but experience is a good teacher.

It follows, therefore, that if we have demonstrated the necessity of the port for the farmer, it may be accepted that,

in their own interests, the railway interests, the financial institutions, the commercial organizations, the shipping agencies, the industrial concerns, together with the co-operative societies will give their support to port development. To some it will at first be a sacrifice, to some an immediate benefit, but to the community in general no possible factor could bring such immediate and lasting advantages.

On the other hand, the port project must be designed so as to retain the goodwill of the community.

The farmer requires, and must have, facilities for receiving, caring for, storing, marketing and shipping his products. The interests of the farmer and the interests of the port authority must be the same: economy, care, security and skill.

The farmer particularly fears overproduction, especially of perishable products. Markets are frightfully susceptible when crops are abundant and everybody wants to sell, and if proper preservative storage cannot be obtained, sacrificial prices must result.

The transportation companies must have impartial service. In addition to up-to-date facilities and economical equipment. the port must be operated, not according to usual public service methods, but according to commercial standards, where efficiency receives its due reward.

The merchant looks to an attractive location, having convenient access and the most modern facilities. For his merchandise he must have safety from pilferage and freedom from undue fire hazard.

For the ship there must be a safe and convenient berth, with sufficient depth of water at all stages of the tide; convenient shore offices for agents and officers; freight handling facilities, and such labor saving devices as may be economical; ample transit shed space, trackage, railway sidings, etc., as will permit a cargo to be discharged and a full cargo loaded per week at each berth. The port facilities in general to be designed for a maximum tonnage, and to eliminate duplication and unnecessary berths.

The governing principles in port design and operation, directly in favor of production, are also the principles by which the port may be of direct benefit to the general commercial prosperity of the country.

Economy.—Transportation and handling economy, in port costs, should add a distinct percentage to the price paid to the producer.

Reception and Storage.—The producer, during the harvesting season, can be forgiven if he is anxious to have another man look after the receipt, condition and shipment of his perishable products. The port may supply these facilities.

Marketing.—To obtain his due share of the consumers' buying price is the dream of the farmer. The port may do more in this direction than any other institution.

Advertisement.—Judicious advertisement will result in a greater demand for products, better prices and in foreign money. A successful port market makes attractive advertising.

Diversified Production.—A comprehensive port will result in a comprehensive market, more widespread shipments and general producing and transportation prosperity.

The producer can obtain directions as to harvesting, condition, container, packing, inspection, methods of transportation, and then forward his products to the port warehouse. Here they will be received by an uninterested port officer, who will inspect, take delivery, put in warehouse and give warehouse receipt.

Co-operatively, auction sales, or sales according to sample, may be carried on, and the buyers from distant cities may then order regular shipments by refrigerator cars, as desired.

It will increase production, it will add to the selling price, it will cheapen food to the consumer, and, by greater volume, there will be general enriching profits.

This is one phase of the "port and its relation to production." It could be written "and its relation to farming." From "production" we may turn to "consumption.

In the proper balance of population and industry there are consumers who must buy the necessities of life. Arguments have been advanced that the cold storage warehouses keep up prices. It may be admitted that it results in stable prices and prevents Saturday-night bargains. By preventing waste, however, it adds to supply, and it is quantity available for sale that regulates the price.

Then, again, if the season for an attractive and useful food is made three months, instead of one month, there is a direct economy to the consumer, and, in general, the condition of all foods offered for sale is improved.

But what about the merchant? The producer is a reasonable man. As soon as he receives his fair share, he will be satisfied. It is injustice he is up in arms against. The merchant will have a greater turnover. There will be safe storage for perishable products. He need not add a high percentage to his price to offset usual perishable losses. The merchant will prosper, though the middle-man may disappear.

Production will be profitable and prosperous; industry and labor will be encouraged and benefited. Transportation will be bettered by the increased volume of freights. Trade will be stimulated. Banking will proportionately increase, and the state will be enriched both by population and wealth.

The port relation to production does not stop at the cold storage warehouse. Production depends to an important extent on fertilization. The cost of fertilizers is an important item in the cost of production. Fertilizer materials are almost all imported. The manufacture of fertilizers is being carried on at many inland points. The tonnage of these fertilizers is high. The terminal which may economically unload ships, deliver direct to cars, or store and ship in car lots to suit interior factories, will aid substantially towards cheapening fertilizers. Raw products manufactured at home, either for consumption or shipment outside, leave an incredible amount of money in the state.

What is the transportation problem? How may the port help to solve it? These are two questions, one of which any farmer may ask, and the other, port authorities should be ready to answer.

Transportation is one of the prime factors in connection with comprehensive production.

Freight rates are most important, but there are other questions almost as important as freight rates. The port is, in many cases, vital as regards routing of freight. It is, therefore, of prime importance. It is, in almost every case, easiest to ameliorate.

The relation of the port to production may be particularly exemplified by the value of facilities for the storage and handling of grain.

One would expect the success of the Montreal Terminals, where, with grain elevator capacity of ten million bushels, installed at a cost of less than eight million dollars, just under 140 million bushels of grain were received and shipped in 1921. And more was offered if there had been sufficient accommodation. Practically none of that grain was grown within a distance of one thousand miles of Montreal.

Fifteen years ago there was a modern elevator in Montreal Harbor, but for two or three years the business did not pay the operating expenses, much less the interest on cost. By co-ordination of facilities, resulting in a port attractive to ships and economical to the shippers, the record of grain shipmen for 1921 may be explained.

The following figures for 1921 show the quantity shipped by Montreal in her seven months' season of navigation as compared with twelve months season at the other ports:—

Montreal	138,453,980 bushels.
Galveston	94,173,049 bushels.
New York	84,698,581 bushels.
New Orleans	73,689,309 bushels.
Baltimore	55,314,808 bushels.
Philadelphia	46,749,286 bushels.
Portland, Me.	13,859,040 bushels.
St. John, N. B. ..	10,638,33ff9 bushels.
Boston	5,078,617 bushels.
Newport News ...	485,118 bushels.

It is an "Act of God" that the rich No. 1 Hard Wheat-growing Areas of America are in the distant West and North-West. The farmers there are vitally concerned in saving a fraction of a cent per bushel on the hundreds of millions of bushels. The freight rates are important, but if there is an excess cost in the port, somebody pays for it, and,

take it from me, it is usually the farmer.

If it has been demonstrated that ports in America, especially national or state ports, should co-operate with the producer, it naturally opens the question as to how this may be done.

The products of mines, important as they are, are special. But mineral products such as coal, ore, oil, etc., are usually so handled as not to call for state aid. It is agricultural products and products of the forest and of the industrial interests that may be most benefited.

To encourage such production, therefore, the port may develop: —

1. Facilities for reception, storage, exhibition and marketing of general articles of production.
2. Cold storage facilities for the care of perishable products.
3. Facilities for the storage and handling of grain.
4. Facilities for proper and economical handling of flour and other grain products.
5. An organization connected with such facilities for the purpose of representing producers from distant points, so that shipment may be made and the producer relieved of any anxiety during his busy season.
6. Co-operation between port authorities, so that exchange shipments of products may be effected to the advantage of producers, both as regards new markets and increased prices.
7. Port manufacturing sites and facilities for improving, conditioning and forwarding to market in desired form and packages.

In America there are very few ports at which these principles have been adopted.

Piers and sheds and depth of water are a good beginning, but the successful port in the future will not only build and operate so as to obtain port revenue, but it will co-operate with the producer, and thereby obtain his aid and backing in the urgent necessity for better port development at important national or state points.

BRITISH PORTS

(Continued from page 7)

capable of dealing with weights up to 250 tons with a lift of 21 feet; a coaling crane capable of manipulating 12 ton wagons; 6 hydraulic coaling tips, each tip with a capacity of 300 tons per hour, and all modern appliances for giving vessels quick despatch.

Supplementary to the above is a fleet of lighters and six floating pontoons of a dead-weight capacity of 800 tons each. Traffic can be conveyed in railway wagons between the various loading and discharging berths at the docks and other places on the Ship Canal, and over the railways to every station in Great Britain. All berths are rail-connected.

Sheds and Warehouses.—On the Dock Estate there are twelve single floor, one two-floor, six three-floor, five four-floor, and fourteen five-floor transit sheds, fitted with the most modern appliances, including a cold chamber of a capacity of 300,000 cubic feet for the sorting of frozen meat and other perishable produce; thirteen warehouses, seven storeys each, fitted with twenty-seven friction hoists worked by gas engine; a warehouse at Vere Street 270 feet by 150 feet; and a warehouse adjacent to the Irwell Park Wharf 1,000 feet by 120 feet. In Trafford Park the company have two single floor warehouses, each 400 feet by 100 feet, four single floor warehouses, each 400 feet by 100 feet, and one single floor warehouse 150 feet by 140 feet, while two other warehouses, each 400 feet by 100 feet, are nearing completion.

Manchester ranks as one of the principal ports in the Kingdom for the importation of timber, and extensive accommodation is provided for its handling and storage. At the docks on the adjoining Trafford Park Estate there is accommodation for the storage of timber under cover. Extensive open storage accommodation is also provided.

The grain handling equipment of the port ranks amongst the finest in the world; there are two elevators each capable of storing 40,000 tons of grain and each possessing appliances for discharging vessels at the rate of from 470 to 1,200 tons per hour.

Grain Elevator No. 1, Trafford Wharf has a storage capacity of 40,000 tons (or 1,500,000 bushels) in 268 separate bins. Several operations (including weighing and bagging) can be performed simultaneously.

An important feature in the elevator is Metcalf's patent dryer, which gives most satisfactory results. The dryer is capable of drying 59 tons of grain at each operation and grain can be moved to or from the dryer or to any bin in the house.

Grain Elevator No. 2, No. 9 Dock has a storage capacity of 40,000 tons (or 1,500,000 bushels) in 341 separate storage bins. Grain can be discharged from vessels on to the bands in the subways along the northerly and southerly quays of No. 9 dock from six berths at one time. Several operations can be performed simultaneously.

There are cooling bins capable of cooling 700 tons of grain at one operation. The grain can be moved from any of the bins in the house to the cooling bins.

Portable Grain Elevators: The Canal Company have provided a number of these for the discharge of grain ships when necessary.

Animals Landing Place is 12 acres in extent, with wharfage on the Ship Canal of 800 feet, and a frontage of 850 feet to Trafford Wharf Road. The Ship Canal at this point is 300 feet wide. The site is particularly well suited for the purpose, being within two miles of the Manchester City Abbatoirs and Carcase Market, and having the advantage of direct and convenient approach. The Ship Canal railways run into the premises, and provide facilities for the distribution of meat all over the country.

The plant includes slaughter houses, cooling rooms, machinery for refrigerating, electric lighting, hydraulic lifts, etc.

The accommodation at present provides for 1,850 cattle and 1,500 sheep, and there is land still reserved to provide, when fully utilized, a total accommodation up to 3,000 head of cattle and 3,000 sheep.

Oil Tankage: Manchester is the second port in the United Kingdom for the import of oil (London being first), and the following are particulars of the oil tankage installations adjacent to the docks:—

No. of Tanks	Wharf.	Capacities	
		Tons	Gallons
23	Mode Wheel Oil Wharf	33,111	8,796,363
7	Eccles Oil Wharf	25,512	6,970,833
4	Weaste Oil Wharf	9,060	2,460,075
2	Barton Oil Wharf	7,585	2,059,612
8	Mode Wheel Oil Wharf	11,050	3,000,000
2	Mode Wheel Oil Wharf	3,845	1,044,171
1	Barton Oil Wharf	8,250	2,240,000
10	Barton Oil Wharf	32,500	8,824,242
57		130,913	35,395,296

Oil is conveyed to each of the above depots through pipes direct from vessel to tanks, from whence it is reloaded into carts, barges, or railway wagons.

Petroleum spirit and other low flash-point oils are not dealt with at the Manchester end of the canal, but, as mentioned above, a dock is now being constructed near the entrance to the canal where steamers with such cargoes can be safely accommodated and the oil pumped to installations which are being constructed by the various companies on the banks of the canal. This depot is expected to be used very freely for the bunkering of oil-driven vessels.

Cold Storage: In addition to a refrigerated transit chamber of a capacity of 300,000 cubic feet, and alongside which steamers can discharge their cargoes, accommodation is provided by the Union Cold Storage Company's store situated near the Mode Wheel Locks, which was specially constructed for the accommodation of the Australian frozen meat trade, with a capacity of 477,942 cubic feet; the same company's store in Miller Street City, with a capacity of 215,255 cubic feet; the Port of Manchester Warehouses, Ltd., Trafford Park, with a capacity of about 1,000,000 cubic feet; the Manchester Corporation Stores, in Water Street, City, with a capacity of 400,000 cubic feet; and Smithfield Market, with a capacity of 140,00 cubic feet.

Regular lines of steamers sailing from the Manchester docks give exporters frequent opportunities to ship direct to the principal foreign and coastwise ports. There is an elaborate system of rail connection between the docks and the principal freight systems on the coast. All

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the docks are connected with the railways, and there are approximately eighty-five miles of lines intersecting the dock estate.

Important new plans have been drawn up for the development of the storage and handling facilities at the docks. A new warehouse with a storage capacity of approximately 54,000 cubic yards is to be built; a "safety" is also being constructed near the entrance of the canal in which large steamers with cargoes of petroleum and other dangerous oils will be accommodated. It is expected that this dock will also be freely utilized for the bunkering of oil-driven vessels. Another important development will be the construction at Manchester of a new dock to be known as Dock No. 10, upon which, although the work has not yet begun, it is certain a start will be made very shortly.

REBUILDING A WRECKED SHIP

One of the most remarkable of ship reconstruction jobs ever undertaken was in connection with a British vessel which played a prominent part in military transport during the war. While in harbor this vessel was set on fire, probably by enemy action, and it became necessary to sink the vessel in order to extinguish the flames and prevent other vessels being burned. When the vessel was salved she was found to be so badly damaged as to be almost beyond repair. Plates were buckled, and deck beams twisted into all sorts of shapes. Eventually, however, she was handed over to a British shipbuilding firm which managed to make order out of chaos. A small army of workmen were kept busy on her for about a year, and the vessel is now afloat and giving as good service as if she were a brand new ship:

"BRITISH GUNNER"

The "British Gunner," a large oil tank steamer which has been built and engined by Swan, Hunter & Wigham Richardson, Ltd., at their Neptune works, Newcastle-on-Tyne, for the British Tanker Co. Ltd., of London, has just left the river after completing a very successful trial trip.

She has been built to attain the highets class in Lloyd's Register and will carry over 10,000 tons of oil. She is 455 ft. in length x 57 ft. beam. The auxiliary appliances for working the cargo and the vessel are of the most modern description, and include wireless telegraphy, a very complete electrical installation, Hele-Shaw steering gear, refrigerating machine for provisions, etc., etc.

The propelling machinery, which has also been built by Swan, Hunter, & Wigham Richardson Ltd., at their Neptune works, consists of a set of turbines of the Metropolitan-Vickers Rateau type, with double reduction gearing of the three box, floating frame type, steam being supplied by three large boilers fitted with Howden's system of forced draught, and burning oil fuel on the Wallsend-Howden system. The principal engine room auxiliaries are driven electrically. The machinery worked on the trial trip without the slightest hitch, and a speed of 11¾ knots per hour was attained.

Neptune Works, Walker,
Newcastle-on-Tyne,
6th October, 1922.

NEW DEPTH FINDER

In the early days of navigation the ordinary sounding line was sufficient to serve the purposes of vessels by giving them warning of the approach of shallow waters. The need for something with a greater range and increased accuracy was felt when the survey of deep waters was undertaken. The famous ship "Challenger," which was chartered by the British Government for ocean exploration, utilized the wonderful sounder invented by the late Lord Kelvin, which replaced the old-fashioned line with a piano wire. The weight attached to this sounder was so constructed that it brought up samples of the deposit on ocean beds; therefore serving a double purpose. With the development of high speeds in navigation, something still more rapid has been called for; and the call has been answered in more than one way. By sending a sound wave downwards from the hull of the ship, and by observing the time taken to receive an echo of the sound from the bed of the sea, the depth of water can be calculated. Another method, which has been carried to a successful issue by a British firm, utilizes light instead of sound. A powerful beam of light is projected vertically through the bottom of the ship on to the sea bed. Further along the hull of the ship is an adjustable tube through which an observer can pick up the beam of light. The angle through which this tube has to be turned gives an indication of the depth to which the beam extends. The operator of this depth-finder is of course quite independent of the speed at which the vessel is proceeding.

POWDERED COAL SUCCESSES

One of the first electric power stations in Great Britain to use powdered coal as fuel was a large municipal station in London. The installation was designed to serve a very large boiler and the results have been so successful that additional plant to serve three more large boilers is to be put down. The main feature of this British installation is that it has enabled coal of a very poor quality to be burnt very economically. The coal is ground to a fine powder which is then forced into the furnace, where, owing to the minute size of each particle, exceptionally complete combustion takes place. The main question for engineers is whether the advantages of burning powdered fuel compensate for the cost of reducing ordinary coal to the necessary fineness.

A NEW CAULKING MACHINE

In view of the large area which the deck of a modern steamer covers, the original method of caulking the seams by hand occupies an unconscionable amount of time. In order to achieve something much more rapid and reliable a British firm recently designed and constructed a machine which can do the work very much better than by hand and in a fraction of the time. This machine, which requires only one attendant, will caulk a seam at the rate of more than forty feet per minute—which is equivalent to the work of about twenty men. The caulking, moreover, is so well done that it does not need to be renewed for a very much longer period than is the case with hand-work. The machine is driven by a 3 horse power electric motor and feeds itself with oakum automatically. Once the machine is started the caulking action is continuous and the machine keeps itself in the exact line of the seam. The whole contrivance can be slung on and off the deck by means of an ordinary crane. It can also move across the deck under its own power when required.

SAFETY DOORS FOR SHIPS

Many of the most useful inventions ever produced seem obvious once they are invented, though had they really been obvious they would have been invented long before. For example, there was no reason why doors on board ship should be made on exactly the same lines as doors in houses. When a ship suffers a collision or runs aground, the decks are liable to be strained so that the doors of cabins become tightly jammed. Obviously, therefore, it was of the greatest importance that the doors should be so constructed that this pressure would not have the effect of preventing the passengers from escaping from their cabins. It has remained for a British company to produce a safety door for this purpose. The only difference between this door and the ordinary one is that the edges of the door are bevelled and fit into a bevelled recess in the door frame. The lock bolt and the socket for the bolt are also bevelled upwards and downwards and are so constructed that if the frame of the door is distorted the bolt will be forced out of the socket. Under no conditions therefore will a passenger on a vessel so equipped run the risk of being imprisoned in his cabin.

Hamilton:—Mr. A. B. Mackay of this city has purchased the steel freighter "Wahcondah" from the Canada Steamship Lines. The vessel is at present on her way to Canada from Europe, and will be employed for the balance of the season in carrying grain from the head of the lakes to Georgian Bay ports. She was built in England in 1903, and was employed on the lakes until 1915, when she went into war service overseas. At the end of the war she was bought by the C. S. L. and now comes back to her original owner.

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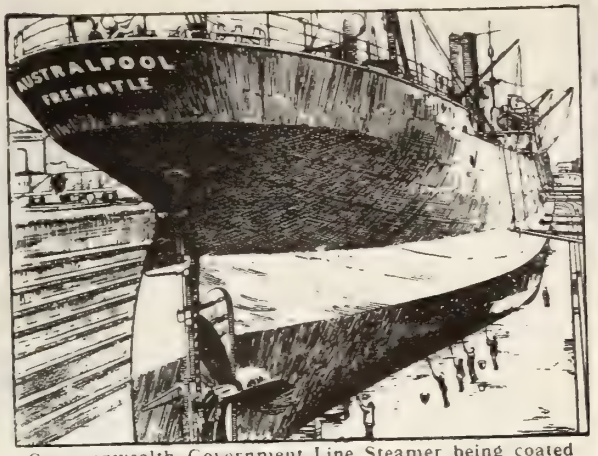

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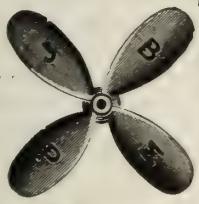

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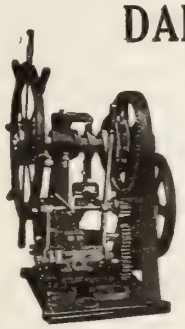

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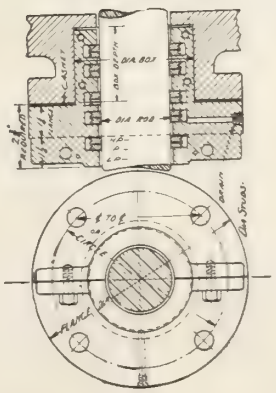

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MARINE NEWS FROM EVERY SOURCE

Halifax:—Sable Island secured another victim when the Gloucester fishing schooner "Marshal Foch" went ashore there and became a total loss. The crew who took to the dories were all saved and brought to Halifax by the Canadian government steamer "Stanley." They lost all their possessions.

* * * *

Cleveland:—Three steamers were fixed to load grain at Duluth and Fort William during the last half of November, and store it at Buffalo, the rate being eight cents, while another vessel was fixed for the first half of December with storage at Erie. There will be a large storage fleet at Erie this year, according to present indications.

* * * *

Montreal:—The number of ocean steamers arriving in Montreal up to the evening of October 8th was 722, as aaginst 636 for the corresponding period of last season. The tonnages were 2,618,506 as compared with 2,080,567 for the 1921 period. Coasting vessels were 175 in number up to the same date as compared with 138 in the same period of 1921.

* * * *

Montreal:—It is reported here that a representative of the North East Engineering Co., of Wallsend-on-Tyne, England, is visiting Canada with a view to establish a branch factory in the Dominion. The North Eastern Marine Engineering Co. is a famous British concern, and one of the most important on the Tyneside.

* * * *

St. John, N. B.:—The C. P. R. steamer "Empress," running on the St. John and Digby route, went ashore near St. John recently, and in order to float her it was necessary to blast away the rock on which she had settled. This was done at low water, and the vessel refloated, with a comparatively small amount of damage.

* * * *

Toronto:—The C. G. M. M. steamers which have been lying up at Goderich and Midland for the past few months have been pressed into service for the purpose of carrying grain from the head of the lakes to Georgian Bay ports. The vessels concerned are the "Canadian Engineer," "Canadian Sailor," "Canadian Adventurer," "Canadian Sower," "Canadian Trader" and "Canadian Pathfinder."

Amherstburg:—The steamer "Norway," which ran ashore in Lake Erie about five miles from Bar Point, has been released by the tug "Harding," and proceeded on her voyage. This was the second mishap suffered by the steamer within ten days, as she ran aground on Russell's Island, in the St. Clair River, just a few days before her second stranding.

* * * *

Dawson City:—The steamship "Dawson," loaded up with passengers for the outside, made the trip to White Horse about October 9th, thus officially closing the season of navigation on the lower Yukon. Among the passengers was Gold Commissioner George P. MacKenzie, who is en route to Ottawa to take up affairs of the Yukon with the Federal Government.

* * * *

San Francisco:—The C. G. M. M. agents in Vancouver report the establishment of a new service between San Francisco and Vancouver in the near future. The service will be a weekly one instead of the ten-day interval now in operation. A contract has been signed between the C. G. M. M. and fruit growers whereby all citrus fruits from California to Canada will be shipped by the Canadian line.

* * * *

Owen Sound:—With the assistance of the tugs "Harrison" of Owen Sound, and "Manisitique" of Sarnia the freighter "W. D. Mathews" was released from the rocks of Cove Island, where she had been ashore for several days. Before she could be floated some of the grain in the forward hold had to be lightered. The vessel is damaged for some 30 to 40 feet from the bow aft, but her condition is not dangerous.

* * * *

Windsor:—The C.P.R. are giving up their car ferry service on the Detoit River, and the two big car ferries "Michigan" and "Ontario" are being withdrawn. For a time the Pere Marquette ferry is handling Canadian Pacific freight from one side to the other, but this arrangement is a temporary one until the C.P.R. concludes arrangements for using the Michigan Central tunnel. The reason for the abandonment of the car ferries is understood to be the high cost of operation, due to the largely increased wage demands of the crews in recent years.

Windsor:—The Grand Trunk Railway have equipped their car ferries "Huron" and "Landsdowne" with oil burners, and will now withdraw the old "Great Western" from the service. Tests carried out on the burners have proved very satisfactory, according to reports of railroad officials.

* * * *

New York:—The conference of steamship lines after a two days' meeting issued a notice to the effect that there would be a big reduction in ocean freight rates, taking effect immediately, between U. S. and U. K. ports. Reductions cover a range of 5 to 40 per cent. below recent rates.

* * * *

Detroit:—The steamer "Arcturus," the 514-foot freighter which was sunk after collision with the "James A. Davidson" below Mamajuda Light, will be raised. For this purpose the wrecking tug "Favorite" was brought from St. Ignace. The James A. Davidson, which was damaged extensively, was lightered by the tugs "A. G. Harding" and "Rescue" of about 400 tons of ore.

* * * *

Hamilton:—Some friction has arisen between the Department of Marine and Fisheries and the city of Hamilton over the appointment of the third member of the Harbor Board. The Dominion government have named William Ainslie and John Newlands for the government, and N. B. Sheppard for the city. The city has wished to have the appointment go to Mr. A. C. Garden, a former representative, but the department claim that owing to the city failing to give documentary notification of their wishes within the statutory time, the government exercised their privilege ,and named the third man on the board.

* * * *

Detroit:—The passenger steamer "Arrow" of the Sandusky and Islands Steamboat Co., was burned to the water's edge at her berth at Put-in-Bay shortly after midnight on Oct. 14th. Fortunately she had no passengers aboard, but the crew were asleep below. They put up a strenuous fight to save the ship, and when it was seen that her case was hopeless she was cut adrift from the wharf, for fear that she should set fire to the dock. She drifted out into the lake a mass of flame, which lit up the whole shore line. The damage is estimated at $75,000.

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Windsor:—The "Louise Philippe," the Northern Navigation Co.'s ferry recently employed on the Port Huron and Sarnia service, caused some interest when she arrived here recently, residents thinking that at last the new ferry had arrived. However, she was only on a trip to gather excess freight for the "Huronic" and "Hamonic" and take it to Sarnia. She may be put on the Leamington and Wyandotte route if sufficient business can be secured.

* * * *

Quebec:—After a three months' trip to northern latitudes, the steamer "Arctic" with Capt. Bernier in command, has returned to Quebec. She left on July 15th, visited Baffin's Land, established a Mounted Police post at Pond Inlet, near Hudson's Bay, in charge of Major C. E. Wilcox, with a corporal and five constables. Another post was established at South Point Inlet, in charge of Staff Sergeant Ray. The trip was without any startling event.

* * * *

Sarnia:—The "Louise Philippe," placed on the ferry service between Sarnia and Port Huron about 4 months ago for the carrying of cars, has been withdrawn for the season. She carried during the four months odd of her service 27,000 cars and 160,000 passengers. The "Louise Philippe" will be put on the service next season, as it is believed that she has been a material factor in popularizing the route between Port Huron and Sarnia for tourists.

St. John's, Newfoundland:—After some twenty years of faithful serivce along the coast of Labrador, the Grenfell Mission steamer "Strathcona" foundered off Cabot Island. Her crew were rescued by the schooner Grace, and landed at St. John's. She was bound from St. Anthony to Bay Roberts to lay up for the winter, and during the trip an old leak opened up, which became too serious to control. She foundered about half an hour after the crew had left.

* * * *

Montreal:—The death occurred recently in Montreal of Mr. John R. Binning, the general manager in Canada and Newfoundland of the Furness Withy Co. Mr. Binning was interred in Mount Royal Cemetery, a large and representative gathering of shipping men accompanying the cortege to the grave side. Mr. Binning is survived by two sons, and four daughters, as well as by his widow.

* * * *

Ottawa:—The Department of Marine and Fisheries have appointed harbor commissioners for the ports of Hamilton and Belleville, the Hamilton appointments being all three made by the Department. The Commissioners for Hamilton are William Ainslie, John Newlands, and N. B. Sheppard, the latter being the city's representative. In the case of Belleville the second member was appointed by the city, the names being Laughlin H. Hughes, and Harry C. Earle.

Toronto:—Signor Francisco Orive Riano, President of the Cuban Navigation Co., who is a guest of the Cuban Consulate in this city, has completed negotiations for the shipment of a large quantity of white pine to the Canary Islands, where there is a large building boom at present. Signor Riano predicted much more extensive trade between the Canary Islands, Cuba, and the Dominion.

* * * *

London:—It is generally thought among shipping men here that the only losers by the enforcement of the new liquor regulations by the United States government will be the people of the United States themselves. At the same time it is likely that Canada will be the gainer, as a number of ships will doubtless be diverted to Canadian ports in place of New York and Boston. The regulations are looked on as crank proposals, and liable to land the U. S. into all sorts of complications if carried out.

* * * *

Cleveland:—The "Kiowa," "Ohondoga," "Oneida," "Montfacon" and "Cayuga," vessels built by the Detroit Shipbuilding Co. in 1919 and 1920, and which have been lying idle ever since at the Company's docks, have been chartered by G. A. Tomlinson of Cleveland, and will be put into service as soon as they can be fitted out. They are all canal-size vessels, with engines amidships, and have a capacity of 110,000 bushels each.

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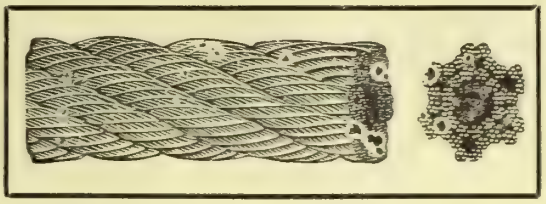

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A monthly review of shipping and maritime matters in Canada and abroad. Published by The MacLean Publishing Company, Limited.

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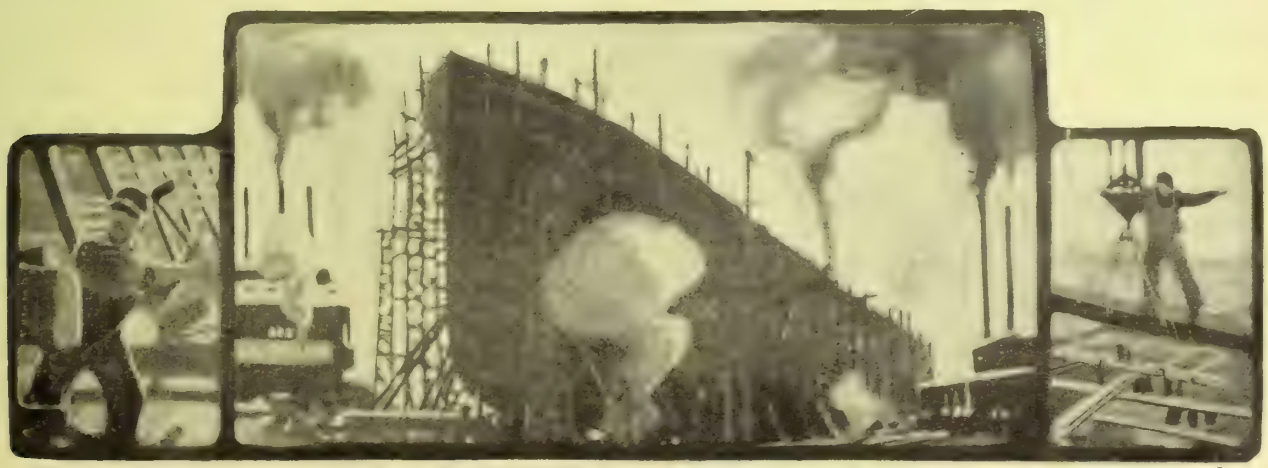

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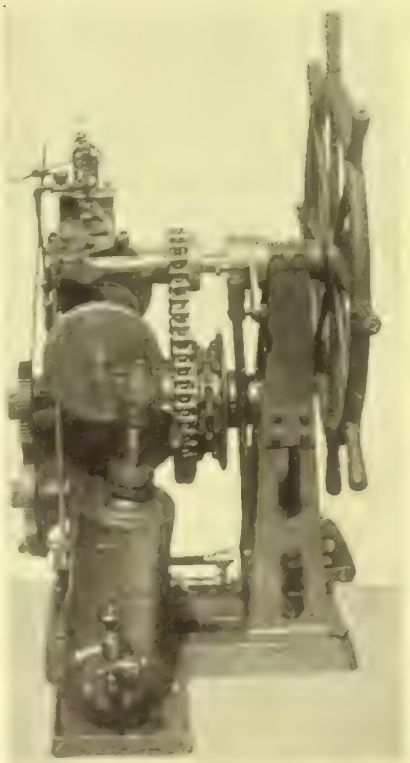

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Current News of The Ancient Colony

Special to "Canadian Shipping"

As this article is being written, the Canadian Government Merchant Marine Steamer "Canadian Seigneur" is somewhere about seven hundred miles North East of this port, in a disabled condition with S.S. Meigle of the Reid Newfoundland Steamship Company, standing by, but apparently unable to do anything in the towing line, as a message received by the Canadian Government Shipping Agent from the battered Seigneur requests that extra assistance be sent, and in consequence S.S. "Canadian Sapper" a sister ship, plying between Montreal and St. John's has been dispatched from this port to the rescue. No detailed information has reached marine circles here with regard to the extent of damage borne by the Seigneur, and until all three ships make port no particulars can be ascertained of the injuries suffered by the ship asking for aid. That there will be an interesting story of ocean ravages to be told later is quite within the bounds, and we hope to have all the data for the next issue of Canadian Shipping.

S. S. "Bethlehem" Towed to Port Aux Basques

On the morning of October 30th, last, a telegraph message was received from the agent of the Reid Newfoundland Company at Port aux Basques, the terminus of the Western section of the Newfoundland Railway, advising that S. S. "Bethlehem" bound from Sydney to Wabana, Bell Island, with a coal cargo for the mines there, had been brought into port by S. S. "Kyle", and safely moored, though in a disabled condition. The first information of the disabled ship had been given by some fishermen on the previous day, who saw the Bethlehem making signals of distress when some few miles off Channel Head. The ocean was very stormy at the time and assistance was at once needed. When the port authorities had been apprised, arrangements were at once made to have "Kyle," then lying at the terminal wharf, Port aux Basques, dispatched to the scene, the time then being about 2 o'clock in the afternoon. Within an hour the disabled ship had been picked up, though owing to high seas the difficulty and danger of getting a towline on board was considerably augmented. Careful manoeuvreing, however, on the part of Captain Stevenson of the rescue ship succeeded in getting both boats fast, and the task of making port was eventually successful, though not without some extra careful navigation and an exhibition of good seamanship on the part of the master of the "Kyle." The "Bethlehem" had apparently run into a heavy gale which had been encountered after leaving Sydney, causing damage to her steering gear, and being badly buffetted in the troughs of the seas began to leak badly. A portion of the bridge was swept away by the mountainous seas running. The ship is still at Port aux Basques, and from all that can be learned from that distance, will have to remain there until repairs can be effected, parts having to be brought across Cabot Strait from either New Glasgow or Sydney. The Bethlehem has been under charter freighting coal from the Sydneys to Bell Island, her owners being the Atlantic Chartering Company of New York. Her tonnage grosses 2,600. Salvage claims have been made by the owners of "Kyle" but the amount of these have not yet been learned.

Officers Courtmartialled

The last echo of H. M. S. "Raleigh," the loss of which cruiser has already been told in "Canadian Shipping," comes in the report of the courtmartial proceedings against Commander Bott and Captain Arthur Bromley taken at Portsmouth, England, on October 26th when the trial of the former was concluded. He was arraigned on charges arising out of the loss of the warship, which was the flag cruiser of Sir William Pakenham, Commander in Chief of the North American and West Indies Station, but who has since been replaced by Admiral Sir Michael Culme-Seymour. Commander Bott was navigating officer of the ship, which was wrecked in thick weather off the coast of Labrador on August 8th. The courtmartial was presided over by Capt. C. K. McLean, chief of staff at Portsmouth. The accused commander, who pleaded "not guilty," submitted that there was no reason before altering course to expect thick weather, and that when fog was encountered its extent and density were not immediately appreciated either by the captain, the officer of the watch or himself. As to the suggestion that he should have begun taking soundings sooner, he said that these were started soon after the ship had been steadied on her new course on which she was to approach land. Until that time he was satisfied that the safe navigation of the ship did not require the sounding party to be closed up, and the officer of the watch shared that opinion. With reference to the suggestion that he should have reduced speed on his own initiative when the ship ran into thick weather, the accused said that while at the sounding machine he had learned that the captain had gone to the bridge, and it appeared obvious to him that the captain would have reduced speed if he considered it necessary. He submitted that no alternative action on his part would have prevented the accident, in view of the fact that the main cause of the ship's stranding was the serious inaccuracy of the published charts. The Court, however, found that the charge of negligently or by default stranding and losing the "Raleigh" was proved, in that the stranding was due to the accused having (a) made an alteration of the course without first having definitely ascertained the position of the ship before doing so; and, (b) omitted to act in accordance with the directions in Article 1018 of the King's Regulations

and the Admiralty Instructions and request the officer of the watch, in the absence of the captain, to take immediate action and reduce the engines to low speed when the Labrador Coast was lost sight of. The Court further considered that, (c) the discrepancy between charts No. 284 and 1631 as regards the longitude of Amour Point Lighthouse, being 0.65 of a mile out was not a contributory cause of the stranding of the ship; and (d) in view of the warnings issued in the Sailing Directions Newfoundland and Labrador Pilot, Vol. 1 (already noted in Canadian Shipping, containing report and story of the stranding) and St. Lawrence Pilot, Vol. 1, the risks accepted by the accused were quite unjustifiable. The sentence of the Court was that the accused, whose certificates spoke highly of his abilities as a navigating officer, should be dismissed H. M. S. "Victory," and severely reprimanded. Captain Arthur Bromley was subsequently tried for the same cause and being proven guilty was dismissed the service. H. M. S. "Wisteria," consort of the "Raleigh," has been lying at anchor in the port of St. John's for some weeks past, her presence being regarded as necessary in the event of the Northern fishermen making a demonstration in the city for a larger price for their season's catch of fish. This idea has been utterly disproven by the fishermen themselves, who have already had a quiet demonstration, and will doubtless gain their points. The presence of the "Wisteria" is looked upon as an overt threat on the part of those upon whom the fishermen have made peaceable demands, and much ill feeling has been engendered against the authorities for the ship's being here.

Fishermen Demand Higher Pay

At the present moment there are some hundred fishing schooners in the port of St. John's, whose crews number above a thousand men. These have arrived by flotillas, their presence being connected with a general demand for an all-round increase in the price of fish. Present offerings by purchasers do not, these men claim, give them any margin of profit on their summer's venture. The peculiarity of the Newfoundland custom of issuing outfits on six months credit comes down from the earliest years of the prosecution of the codfishery, and is perhaps one of the greatest evils of trade ever inflicted upon the people of a country whose sole dependence is on the proceeds of the fishing industry. While the war was in progress the prices of products of the ocean became as much inflated as those of any other industry and for that reason the fishermen did not feel the strain of the times as much, perhaps, as the people of other countries. But with the conclusion of peace the fish price boom burst and figures rapidly declined out of all proportion to the reductions in the prices of the necessities of life. Hence there came a great falling off between cost of outfit and returns from the voyage. This has been going on since 1920, and at length the producers have awakened to the fact that they must take measures to protect themselves if they are to live. Their present demand is for a better price for fish, an equitable reduction of taxation, and retrenchment in government expenditure. They contend that they are the main body of those upon whom the burden of producing the current revenue falls. With able leaders and learned advisers they have demonstrated their ability to take care of themselves, and their recent movement has stricken terror in the ranks of the government. Ergo, the presence of H. M. S. "Wisteria" in port. As the new crusade has but merely developed it cannot be prophesied where or when the end will be; but the question must be settled finally and completely within the next two weeks. The combat will be absolutely bloodless, yet cannot end in anything short of victory for the fishermen.

Halifax Notes

THE White Star Liner Canopic on her arrival here on Nov. 20 opened the Halifax 1922-23 winter port season. The Canopic from Bremen via Southampton also inaugurate the call westbound for the White Star liners engaged on the Bremen-New York service recently revived. At present the Canopic is on this service in conjunction with the Pittsburgh.

* * * *

As yet the extent of the activities at Halifax during the winter season cannot be predicted but it is expected that it will be a better season than that of 1921-22. All the passenger lines have a large number of sailings both eastbound and westbound scheduled and if there are no cancellations Halifax will have its share of the Canadian trans-Atlantic passenger traffic during the coming winter.

* * * *

The Canadian Government Merchant Marine have about equally divided their freight services between Halifax and St. John for the winter season. Those ships maintaining the services to Australia, the West Indies and Newfoundland will have Halifax as their terminal, while the ships engaged in the services to London, Liverpool, Glasgow, Cardiff and other trans-Atlantic ports will operate out of St. John, although it is quite possible that some of them will call here enroute east.

* * * *

From the opening of the apple export season to the end of October a total of 309,799 barrels of apples, grown in Nova Scotia, have passed through the Port of Halifax to the markets of the United Kingdom. This is nearly eighty thousand barrels in excess of the shipments for the same period last year, when 230,787 barrels were shipped.

* * * *

Liquors, principally rum from St. Pierre and Demarare, which had been seized on the Cape Breton coast during recent months by revenue cutters, revenue officers and custom officials, and valued at about $100,000, were brought to Halifax this month by the revenue cutter Sagamora and placed in a government bonded warehouse.

A number of tern schooners have taken cargoes of lumber from Halifax during recent months, principally to New York and other American markets.

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The American two masted schooner Freddie Eaton was recently purchased by Captain James E. Ogilvie, of Parrsborro, who will use her in the coasting trade.

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Another recent schooner sale was that of the Lyola, 91 tons register, purchased by M. A. Nickerson of Clarke's Harbor. She is also being used in the coastal trade.

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During the past month a new loading barrel device invented by Captain W. E. Johnson, was given several tests at Halifax on steamers taking apples and worked satisfactorily. It is claimed that it will load at an average of 400 barrels an hour whereas the average loaded by slings is only 250 barrels.

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Much interest was taken in Halifax in the drydocking of the Majestic at Boston as her commander, Sir Bertram Hayes, formerly of the Olympic has many friends here, which he made during the war and the period following when the "Old Reliable" made regular trips to Halifax transporting troops.

Fort William—The steamer "Kiowa," one of the wartime vessels built for the U. S. Shipping Board, had a narrow escape from foundering on her maiden trip to this port recently. She had never been loaded to capacity before, and shortly after she put out a serious leak was discovered which resulted in water getting into the oil fuel. The anchor had to be dropped, and it was impossible to keep steam enough to blow the whistle. Fortunately during the night signals attracted the attention of a Tomlinson liner, which was able to supply the Kiowa with oil, enabling the crew to get the pumps to work and get the vessel to dry dock. She lost 125 tons of oil, and her cargo was partially damaged in addition. She has been repaired and is now again in service.

News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

THE closing of the navigation in the river St. Lawrence officially took place on the 25th of November, which means that the continuation of navigation will be carried on at the risk of the ship owners as the marine insurance companies will not accept risks after the official closing date. The official closing of navigation is given a great deal of publicity throughout the marine world with the result that it is difficult to induce foreign ship owners to send their vessels into the St. Lawrence after the first week of November. It is a fact however, that ice never appears in the St. Lawrence until the beginning of December and even then the river from Quebec to the sea is open to navigation. The harm done by the public announcement that St. Lawrence navigation is closed after the 25th of November, can be gaged by the fact that owners of vessels approached with a view to chartering for carrying grain from Quebec have refused to charter their vessels on the ground of fear of damage by ice.

The demand made by the United States western grain shipping interests supported by the American Farm Bureau of Federation for an embargo on the shipment of Canadian grain through the United States during the congestion in the latter part of October and the beginning of November wiped out any chance that Quebec might have had in the November shipment of grain. Owing to the congestion of American and Canadian grain afloat and in the elevators of the Great Lakes arrangements were made to ship several million bushels of wheat through Quebec Harbor Commission elevators, when the demand for the embargo came and caused a cancellation of the arrangements made and up to that time less than one million bushels of wheat had been shipped through the Quebec elevators, and since then approximately two million bushels have arrived and been shipped from this port. This grain arrived over the C. P. R. system and not one bushel of grain was brought to Quebec by the Canadian National Railways. These lines were busy engaged in hauling grain to the elevators at Portland, Maine. The Canadian Shipping and Marine News in its last issue discussing the situation in connection with the shipping trade of the St. Lawrence and merits of the ports of Quebec and Montreal, says editorially:—"It is a very serious charge to make that there is a conspiracy in shipping matters in favor of Montreal as against Quebec and that the shipping interests in Montreal are in favor of giving business to the United States ports rather than see it go to Quebec."

What are the facts which lead the Quebec people to these conclusions? An ocean steamer making Quebec its terminal port would save as compared with Montreal two days each voyage, in wages of crew, provisions and pilotage and one-tenth per cent. of its insurance premium. Nevertheless the rates of freight and passage established by the Montreal Shipping Federation annually are the same to and from Quebec as to Montreal and in some cases 2/6 added to the tariff upon goods discharged at Quebec. Passengers to the ocean liners are charged the same price when disembarking at Quebec as at Montreal.

Quebec people are proud of the wonderful activity of the port at Montreal and as an evidence of the wonderful growth of Canada and realize that it is only natural that freight originating in Ontario or the Western States should take the ocean steamer at Montreal; the saving inland rates makes it possible to do so. For the traffic of the prairie provinces the building of the transcontinental has completely changed the situation. That railway saves 214 miles in the distance between Winnipeg and the ocean. The grain of the prairie provinces or a good share of it should therefore take the ocean steamer at Quebec. Not a bushel of it comes here and only a trifling percentage finds its way to Montreal; about 80% of the whole export trade of the Western provinces goes to New York for shipment. Why? Because the railway managers fix an arbitrary tariff which prevents the use of the new railway. Canada thus loses an enormous trade, almost equal in volume to the wonderful trade from other sources which is being done at the port of Montreal.

Quebec appeals to Montreal for cooperation in obtaining justice and in securing this business for Montreal, Quebec, Halifax and St. Johns and the Montreal Board of Trade as well as the commercial press of Montreal refuse their help. Apparently they would prefer to see the business go to New York rather than allow any other Canadian port than Montreal to get a share. As a Montreal director of a shipping concern expressed himself to your correspondent, "We will never allow any of the shipping now going to Montreal to go to Quebec if we can help it, for the reason that should the shipping go by chance to Quebec we know we would never get it back again." Though the shipping has been very light during the past summer, the export of lumber from Quebec to the United Kingdom has been 100% better than it was in 1921. The passenger traffic by the ocean liners particularly as regards immigration, has been light in comparison to previous years altogether due to government restriction on immigration. Those familiar with this all important question do not regret the government restriction on immigration as it refers to foreigners, as it has kept out of the country many thousand undesirables from continental European countries of Bolshevik tendencies to cause trouble in Canada. The need for new settlers in Canada has become a very important question and one that should not be looked upon with selfish motives by steamship or railway companies who will profit by the fares they will receive. It is a question which must be studied with the greatest prudence and mathematical consideration as far as it refers to permitting the riff-raff of Russia, Poland and other continental countries to enter Canada to plant the seed of discontent by their revolutionary ideas. But all restrictions should be removed for the immigration of the farmers, farm-laborers and domestics of the United Kingdom and they should not only be encouraged to come to Canada but should be assisted in every possible way.

The province of Quebec offers as rich opportunities to the British desirous of immigrating as any other part of the Dominion and the Canadian Government should encourage as much as possible the settlement of the British immigrant in the province. The Quebec provincial government will do nothing to encourage the British immigrant to settle in this province, but on the contrary want all the English speaking families to move out of the province. The desire is not openly expressed, nevertheless there are signs of the wish to be seen and heard to this effect all over the province every day.

A remarkable feature of the steamship passenger traffic this season is the large number of tourists using that route, upwards of 20,000 American tourist travellers having come this way. They were all very enthusiastic both over the scenic beauties and the accommodation provided for them. The Canadian Pacific "Empress of France," "Empress of Scotland," and "Empress of Britain" which make their terminus at Quebec, are the favorite vessels and every trip carried distinguished passengers from every country in the world.

In connection with the Canadian Pacific steamship business is the remark-

able efficiency of the railroad activity. With the arrival of every Canadian steamer the Canadian Pacific Railroad arrangements to carry their passengers to Canadian west and United States destinations are well worthy of special notice. For instance, when the "Empress of France" arrived and docked at Quebec on the 9th of November the passengers were landed at 6.10 p.m. and a special steamer train, drawn up alongside the landing shed left the dock with the saloon and cabin passengers and their baggage at 7.10 p.m., just one hour after the steamer's arrival. This train made the run from Quebec to Montreal in four hours and five minutes, enabling passengers to make connections for Toronto and Western Canada the same night. Another example of C. P. R. efficiency in handling passenger traffic was shown in the case of the C. P. steamer "Metagama," which arrived and docked at Quebec on November 11th. A special train with third class passengers left the immigration shed at 5.30 p.m. and was handled through to Toronto, making the connections at that point with the regular train service for Western Ontario, Detroit, and Chicago. In both these cases passengers were taken to their destination in record time. In no other port on this continent is the railroad service in connection with the steamship passenger traffic handled with such efficiency.

St. John Notes

THE various steamship companies and railways are looking forward to a very busy winter season at the Port of St. John.

The reports received from the C. P. R. and C.N.R. would indicate that as far as grain is concerned the port will be worked to capacity.

Grain is now enroute to this port from Fort William which should arrive in St. John about the middle of the month.

The cause for the exceptional amount of grain expected, is based on the coal and railway strikes in the United States and this commodity will therefore be routed via Canadian ports.

The Canadian Government Merchant Marine announce their intention to maintain eight distinct ocean services with a fleet of twenty-two vessels. Thirteen ships will make St. John their home port and the remaining nine will run out of Halifax. The British services from St. John will be to Liverpool, Cardiff and Swansea, and Glasgow.

The coming season will be the first of a service of Furness Line steamers to Hull. This service will correspond to the one formerly from Portland to Hull, fortnightly. The first steamer will be the Lexington sailing from St. John December 9th followed by the Ariano December 23rd, then probably by others.

The Manchester Line will begin their winter sailings to Manchester on December 9th by the sailing of the "Manchester Producer." This will be a ten-day service.

The C.P.R. expect to begin their winter port services about the middle of this month.

During the last period, Oct. 15 to Nov. 15, there was considerable activity in the Port; considerable sugar was imported for account of the local refineries, various shipments of potatoes cleared for Cuba, and a large quantity of laths and lumber for United States.

Complete shipments of potatoes are also moving via Charlottetown, P. E. I., three of four cargoes recently cleared from there for Cuba.

The following is a summary of sailings, outside of regular lines clearances, for the period Oct. 15 to Nov. 15:

"Lake Winthrop" cargo raw sugar for local refineries.

"Krosfond" cargo raw sugar for local refineries.

"Inca" cargo raw sugar for Atlantic Refineries.

"Mattawa" cargo raw sugar for Atlantic Refineries.

"Eastern Leader" loaded cargo of refined sugar for Hull and Newcastle.

"Wagland" inward with cargo raw sugar for refineries.

"New York City" inward with cargo coal from Cardiff.

"Eastern Sword" outward with cargo refined sugar.

"Huftero" inward with cargo lumber from Pacific Coast.

"Rockaway Park" loaded cargo flour for Riga, Petrograd.

"Venator" outward with cargo of potatoes for Havana.

"Varg" outward with cargo potatoes for Havana.

"Varg" inward with cargo raw sugar for refineries.

"Tosto" inward with cargo coal from Cardiff.

"Chickasaw" outward with cargo of refined sugar for London, Hull and Leith.

The schooner "Charles F. Gordon" loaded a cargo of potash for Halifax.

Repairs to the Lurcher lightship, which was brought into this port recently to be refitted with moorings after an accident at her station, were finished last evening and the ship proceeded to her location to-day.

Distress signals flying from the lighthouse at Bird Rock, Magdalene Islands, and the report that the light was not burning, caused the Marine Dept. to send the customs cruiser "Margaret" to the scene. Four of the five people in the lighthouse, the keeper, his brother, another male assistant and Mrs. Turbide, mother-in-law of the assistant keeper, Bourke, were found very ill and Mrs. Bourke, the assistant keeper's wife, attending them. They were placed in the cruiser and headed for Georgetown, but on arriving there no doctor was available, and the Margaret came to Charlottetown. Bourke died on the trip. He had been married only three months.

Damage amounting to many thousand dollars was suffered by North Shore fishermen during violent gales of last week, according to advices from isolated places. Many fishing craft and boat houses were washed away.

Mr. Fraser S. Keith, general secretary to the Engineering Institute of Canada, while here in the interests of the Institute, was entertained at a dinner given by the St. John Dry Dock and Shipbuilding Co., Ltd.. The dinner was held at their plant. Mr. Keith was taken on a tour of inspection around the drydock.

The gates of the drydock are already under construction, 80% of the dredging of the channel is completed, and a portion of the pumping equipment has arrived from Scotland. It is expected the drydock will be in readiness for the grand opening next fall.

An agreement has been reached between the Freight Handlers' Union and the C. P. R. officials regarding a wage scale, and working conditions for the coming season. The members will receive forty-five cents an hour, a three-cent reduction from last year, but double time will be paid on Sundays and holidays and time and a half for overtime, which is the same as last year.

The following is a statement of lumber and lumber products exported to the United States from St. John consular district, for the quarter ending Sept. 30, 1922.

Laths	$223,796.93
Lumber	376,930.11
Pine lumber	23,942.93
Pulpwood	49,631.36
Shingles	7,622.58
Spruce piling	3,908.55
Elm staves	863.28
Wood pulp	277,811.89
Hemlock	5,740.91
	$970,248.54
Exports for corresponding quarter in year 1921	$753,492.16

The three-masted schooner "Samuel Hart," of New York, was sunk in collision with the sea-going tug "Wyoming" five miles east of Small Point, at the entrance of Casco Bay. Captain Johnson of the sailing vessel and three of his crew were taken from their vessel and brought to this port by the Wyoming last night.

The C. P. R. steamer Empress arrived from Halifax, where she was repaired after grounding on the ledges at Black Point. She resumed the St. John-Digby service November 6th. The government steamer "Aranmore" which temporarily replaced the Empress, returned to Charlottetown, P. E. I.

Senor J. W. Stable, Cuban consul in this city, left for New York. His reason for not remaining in St. John was

ill-health brought on by an attack of bronchitis.

Senor L. Brava, Cuban consul of Montreal, is temporarily in charge of the St. John office.

Senor Stable has been about twenty years in the Cuban consular service, having served in Germany, Switzerland, United States, France, Spain and Canada.

The St. John Dry Dock and Shipbuilding Company have had in contemplation for some time the construction of a Marine railway in connection with their ship repair operations at East St. John. The foundation work will be started immediately. The railway will be capable of hauling up smaller vessels, tugs and scows not exceeding 2,000 tons; this will enable repair work to be carried on continuously and not dependent on tide work.

The schooner "Seaman A. O," one of the vessels chartered to bring coal for account of R. P. & W. F. Starr Ltd., went ashore on Sow and Pigs ledge with 750 tons anthracite, which was destined for this port. The schooner was pulled off and towed to New Bedford, where temporary repairs were made. Her sail and rigging had been previously removed by cuttyhunk fishermen, and about half of her cargo had been taken off by numerous fishing boats.

It is estimated that about two million feet of lumber was destroyed by fire which broke out in the mill of Stetson Cutler and Company at Pleasant Point. The mill and buildings were completely destroyed. Fortunately the wind was in the opposite direction from the mill and yard of J. E. Moore Co., or a great deal more loss might have occurred.

The steamer Dream which plied on the St. John river service, sank recently near Gorham's Bluff with a loss of five lives. The steamer has since been refloated and towed to St. John.

The accident was caused by a heavy squall of wind catching the steamer's beam and turning her over. The bodies of the unfortunate victims have since been located.

Major E. A. Belcher, Colonel Christie and Mr. Bates, visiting members of the British Empire Exhibition, were in St. John Nov. 4. During their stay Colonel Christie and Mr. Bates were taken on board the tug Neptune for a tour of inspection of the St. John harbor.

MOTOR LIFE BOAT PROVES ITS WORTH

The Royal National Life Boat Institution maintains a fleet of life boats around the coast of the United Kingdom, and of late years has been gradually placing motor life boats on the stations in place of the sail and oar propelled boats of older days. That they are a distinct improvement on the older type of boats is proven by the following extract from a report of the Eastern District Inspector of the Institution. To those who know the sea it will be easy to read between the lines of this plain statement, and visualize just what these men went through in performing the rescue, and the terrible time undergone by the crew of the wrecked ship while awaiting the success of the lifeboat's efforts. Following is the report:—

On Friday, the 20th instant, at about 11 a. m., I went down to the harbor at Gorleston with the intention of visiting the lifeboat house. I then heard for the first time that the Gorleston No. 1 boat was out on service.

I proceeded at once to the coastguard look-out, where I obtained the following information from their log-book:—

October 19th.—9.45 p. m., C.G., Gorleston, observed rockets to N.E. 9.48 p. m., Caister cox. reported preparing to launch. 9.50 p. m., Gorleston fired green rockets. 10.29 p. m., Cox. Gorleston to cox. Caister: "Is your lifeboat launched yet?" 10.30 p. m., reply: "Just in water; will shortly be away." 10.42 p. m., Harbormaster to hon. secretary, Caister: "Please let me know as soon as possible if your boat can get off, otherwise I shall take the Gorleston lifeboat out." 10.50 p. m., St. Nicholas light vessel fired two red rockets and one gun; Gorleston answered with green rockets. 11 p. m., Caister reported: "Our boat unable to get away." 11.3 p.m., H.M.T. "Kennet" (lying at Yarmouth) reported by W.T., "Wreck breaking up." 11.10 p. m., Gorleston No. 1 launched and proceeded in tow of tug "George Jewson" to wreck.

I subsequently learnt from coxswain that on arrival at the scene of the wreck he was unable to do anything until daylight, owing to the darkness and terrific seas.

At daylight they approached the wreck, only the amidship portion of which was above water. No sign of life was visible and very heavy seas were sweeping right over.

They remained there for about two hours, and then, being forced to the conclusion that there were no survivors, the tug and lifeboat returned to Gorleston, arriving there about 9 a. m., October 20.

About one hour afterwards C.G., Caister, reported a flag was being shown from the wreck. Coxswain consulted the temporary honorary secretary, Mr. A. D. Snell, and returned with tug to wreck, Mr. Snell accompanying them.

Scene of the wreck was at the extreme N. end of North Scroby Sands.

At about 3.30 p. m., it being L.W. and the lifeboat apparently still unable to get alongside, I phoned Lowestoft, calling out motor lifeboat, with instructions to call at Gorleston.

Darkness had fallen before we reached the wreck, and we met the tug and lifeboat returning. Stopped them, and learnt from Coxswain Gorleston No. 1 that he had been unable to get alongside wreck owing to terrific seas, broken portions of the hull and the remains of an old wreck some 30 to 40 yards off. His boat was apparently damaged by striking heavily on the sands.

I asked him if he would return to the wreck with us, which he immediately volunteered to do, and came on board. We then proceeded. On arrival at the scene of the wreck it was obvious that nothing could be done that night owing to the intense darkness and very heavy seas. After consulting with Coxswains Swan and Fleming, we decided to return to Gorleston and make a further attempt at daylight, Fleming assuring us that no useful purpose could be served by our remaining at sea all night.

He further stated that he considered that the only chance of getting alongside the wreck was to tow the Gorleston No. 2 boat out to the scene and let her cross the shallow water.

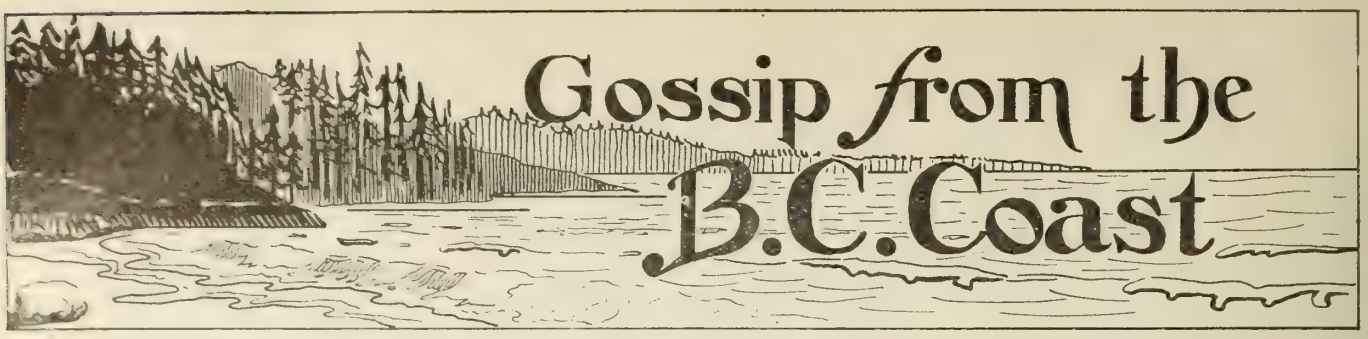
Arrived back Gorleston 7.30 p. m., and made arrangements, if weather moderated, to tow No. 2 boat out at daylight. Five of the Lowestoft crew (masters of fishing craft) returned to Lowestoft as they were due to sail the next morning.

I took in ten gallons of petrol (Shell No. 1) as a "standby" in tins on deck, as I was unable to obtain aviation spirit locally. Mr. A. D. Snell arranged food and accommodation for Lowestoft men.

At 3.30 a. m., Saturday, October 21st, I mustered the crew of the boats. As the weather had become worse, and as I was assured that the north-easterly gale would force up a big flood, I decided that it was too risky to take the Gorleston No. 2 boat out there. I replaced the five Lowestoft men with seven Gorleston men, which included the coxswain, second coxswain and bowman of the Gorleston No. 1 boat.

Left Gorleston at about 4.30 a. m.; N. E. gale and squally, rough sea, very heavy on sands. Arrived at the scene of the wreck at daylight; found only bridge and fidley casing above water. Fore and after decks were completely submerged, and hull of vessel split down on after part of fore deck, or fore end of after deck, with jagged edges of plates projecting, leaving barely the length of lifeboat in which to come alongside. Dropped anchor astern and to windward of wreck, and veered down. Whilst doing this the lifeboat was struck by a terrific sea and almost thrown on to after deck.

Had it not been for the powerful motor fitted in this boat, I do not consider we could have got alongside. Sheered alongside, and shipwrecked crew jumped and slithered down ropes into life boat (in about 30 seconds). Steamed ahead to cable, the light of which had fouled the sunken portion of the wreck, and which with the very heavy seas it was impossible even to make an attempt to clear. This was cut, and almost at the same time lifeboat was buried by a terrific broadside sea; fortunately no one was washed out, and lifeboat returned to Gorleston, arriving about 7 a. m. Proceeded up river to Yarmouth and landed shipwrecked crew of 24 (and one black kitten) at Hall Quay, where they were sent in charge of Coxswain Fleming to the Sailors' Home.



THE Canadian-Australian Royal Mail Line will have a new liner in service in 1924, operating between Australia and British Columbia ports, according to Charles Holdsworth, managing director of the Union Steamship Company of New Zealand. The new steamship will be the first big trans-Pacific passenger liner to be fitted with high power internal combustion engines. The contract has been awarded to the British shipbuilding firm of Fairfields, the ship to be launched in twenty months. The ship is to have accommodation for 290 passengers and about 13,000 shaft horsepower.

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Rumors that the steamships Monteagle and Empress of Japan, formerly operated in the trans-Pacific route by the Canadian Pacific Steamships, Ltd., have been sold, are again current on the coast, but without confirmation. The Empress of Japan is now docked at Vancouver, while the Monteagle is now on her way to Montreal.

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Adam Lothian Russell, director of the British Canadian Steamships, Ltd., and for years active in British Columbia shipping, died at his home in Vancouver, October 24. Mr. Russell was formerly head of the Canadian Western Steamships, Ltd., and was president of the Ocean Packing Company.

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Between $1,500.000 and $2,000,000 will be spent by the Canadian Pacific Railway in building its new piers in Vancouver. The contract for construction has been awarded to the engineering firm of Sydney E. Junkin & Company, of Winnipeg and Vancouver. The fill was completed several months ago and erection of the piers themselves will be commenced practically at once. Whether creosoted piling or concrete will be used is not yet announced, but the floor will be of concrete and the equipment will be such as to insure sufficient freight and passenger handling facilities. The pier will be 850 feet long and 330 feet wide, and will be used primarily for the docking of the company's big trans-Pacific liners. A causeway over the C. P. R. railway tracks will connect the pier with the city. The specifications call for a modern double-decked shed.

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Contracts have been signed giving control of the citrus fruit trade between California and British Columbia to the Canadian Government Merchant Marine, which now operates two steamships on a regular schedule in the coastwise route.

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A. Melville Dollar has organized the Universal Shipping Company and will concentrate in the Oriental trade. He was formerly vice-president of the Canadian Robert Dollar Company, but resigned recently to give more time to his personal shipping interests.

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Bellingham is to be the American terminus of the new ferry service to be established between Vancouver Island and the mainland by the Canadian Pacific Railway. The Quackenbush dock will probably be used at Bellingham. The Vancouver Island terminus is not so definite, although it will probably be Sidney, which is already the terminus for the Anacortes-Sidney ferry route established last summer. Both Saanichton and Victoria are in the running, but Victoria interests will not offer opposition to any other port, as the majority of business will go to Victoria anyway on account of the increased tourist trade. The C.P.R. ferry will have accommodation for about fifty cars and the contract for construction will be awarded in a few days, probably to Yarrows, Ltd., Esquimalt, or to the Wallace Shipyards, North Vancouver. Captain Harry Crosby, who operated the ferry steamer Harvester King between Sidney and Anacortes this year, is building a new ferry of similar size to the C. P. R. boat and this will be operated in the same route next year. It will be ready for service April 1. The new vessel is being built in Seattle and will be equipped with a 500 horsepower Diesel engine. Both the C.P.R. and the Crosby steamer are being specially equipped for handling automobiles.

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The Canadian Government Merchant Marine is now developing important trade with Mexico and is working in conjunction with the New Mexican States Line, with head offices at Salina Cruz, operating a fleet of six British "mystery" ships. British capital is developing the industries of the Mexican hinterland served by these vessels, which sail to San Pedro and San Francisco, and at these ports they connect up with the regular service maintained by the Canadian Government steamers with British Columbia. The trade thus far is one of barter, Canadian manufacturers sending flour south and the Mexicans exchanging their natural products for it. Agents for the Mexican line are sending about fifty tons monthly, but hope soon to increase to 500 tons.

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All the Dollar steamships are to be converted into oil burners on account of the high cost of coal on the Atlantic and the cheaper price of oil on the Pacific. The Robert Dollar, largest of the fleet, and the Esther Dollar, both of the round-the-world service, are now having the necessary changes effected in New York.

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The Pacific Salvage Company, with headquarters in Victoria, has been called upon to rescue the British steamer Guerrara, which ran ashore recently off the central Mexican coast, 2,500 miles away. The salvage steamer Algerine, formerly British sloop-of-war, has been rushed to the scene.

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When it was announced from San Francisco that fourteen shipping companies operating in the trans-Pacific service had reached an agreement as to rates and would put up $25,000 bonds each as a guarantee of their sincerity the impression quite naturally was created that the rate war was dead, and that a new spirit of peaceful co-operation among the principal lines had been born. That this early impression was perhaps ill-founded is indicated by recent developments. Not only have the companies not posted their bonds, but one or two of them have shown a disinclination to bind themselves by the agreement. The Blue Funnell Line is the first to break away, having withdrawn its January westbound lumber rates. The Canadian Government Merchant Marine has definitely declined to post a bond, although it has tentatively agreed to maintain the conference schedule. The three Japanese companies, which were not represented at the conference, and for whose co-operation hope was expressed until recently, have now declined to join. These companies are the Mitsui Company, Suzuki Company and the Yamashita Kiso Kaisha. The conference idea was first advanced by Atlantic concerns operating to the Orient out of the port of New York, but Pacific

operators point out that Atlantic operators were the first to undermine agreement out here by sending their carriers into Pacific routes at less than standard rates. At San Francisco it was decided to give San Francisco, Seattle, Portland and Vancouver each one vote.

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Fifteen million bushels of wheat will pass through the port of Vancouver this year, as compared with seven millions last year, according to estimates of railway officials. If adequate facilities were provided, the port would handle at least forty million bushels, they say. The rapid development of Vancouver as a grain port has exceeded the expectations of those most closely associated with port affairs. Nearly all the grain passing through Vancouver goes to the United Kingdom or to the Orient. Members of the Canada Grain Board, headed by Leslie H. Boyd, conferred recently with representatives of Vancouver business interests regarding proposed construction of a new elevator and other matters concerning the port's wheat business.

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The ocean lines, passenger and freight, now operated by the Pacific Steamship Company, will soon pass into control of the Dollar interests, headed by Capt. Robert Dollar, the veteran shipping magnate of the Pacific who started his business career in an Ontario logging camp. Important changes in the trans-Pacific service to be maintained by the newly organized Admiral-Orient Line are contemplated. R. Stanley Dollar will be president; J. Harold Dollar, H. M. Lobar and A. F. Haines, vice-presidents, and Merrill Robinson, secretary. Stanley Dollar will devote the whole of his time to the new company and will have his headquarters in Seattle. Formation of the new company is accepted as an indication that H. F. Alexander, former president of the Admiral Line, has retired from the trans-Pacific field and will devote all his energies to the coastwise business of the Pacific Steamship Company.

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Negotiations are now going forward for the establishment near Vancouver by the Canadian Marconi Company of a $2,000,000 wireless station, capable of communicating direct with Australia and the Orient. The proposed station will operate on 12,000 volts and will have a daylight sending radius of 7,000 miles, with practically double that distance at night. A wave length of 20,000 metres will be utilized by the plant.

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The Dominion Government's attitude towards the proposed building of another grain elevator at Victoria is hesitant, and business interests are now urging the Harbor Commission to go ahead with the project, floating its own bond issue. The present grain handling facilities at the port of Vancouver have proved insufficient to meet the requirements of the rapidly growing movement from the prairies to the United Kingdom and the Orient via the Pacific coast and a severe congestion has resulted. With an abundance of tonnage available, conditions would not be so bad, but the infrequency of sailings of wheat carriers lately resulted in a "jam" of 650 freight cars loaded with grain, and Vancouver interests feel that unless an improvement is effected the reputation of the port is at stake.

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The Robert Dollar Company is now making a practical test of the feasibility of a regular steamship service between British Columbia and the Atlantic seaboard, and the steamer Grace Dollar is now on her way east with a trial shipment of lumber. On the financial success or failure of the service will depend the company's plans for future development in the field.

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Dominion letters patent for the British Columbia Pilotage Association have been received and the organization is now firmly established in its position. In the letters patent is included a clause which the coast pilot association has sought for many years, and which the Federal Government would not grant when pilotage was under the Department of Marine—that of power to draw up examination papers, appoint examiners and grant certificates to pilots.

THE WORLD'S LARGEST MOTOR LINER

The oil engine was first applied to comparatively small vessels, but year by year the size of ships driven by oil fuel used in internal combustion engines has steadily increased. The highest point yet reached is represented by a passenger liner shortly to be built in a British yard. Her length is 600 feet and she is to be equipped with oil engines developing 12,000 horsepower—which is about twice as great as in any motor vessel so far built. The machinery will consist of four six-cylinder oil engines, each developing 3,000 brake horse power at 135 revolutions per minute. The speed of this unique vessel will be eighteen knots.

LARGEST FLOATING DOCK IN THE WORLD

It is officially announced that the contract for Southampton's huge floating dock has been secured by Sir W. G. Armstrong, Whitworth & Co., Ltd. This dock, which is by far the largest ever projected, will be nearly 1,000 ft. in length, and will be able to accommodate even the mighty Majestic, the greatest vessel afloat, which has a length of 912 ft., and a gross tonnage of 56,000.

The building of the dock, which will occupy about eight or nine months, will provide much needed employment for thousands of workers on Tyneside. Upwards of 20,000 tons of steel will be required for the work.

It is understood that the dock will be constructed at the great Armstrong shipyard at High Walker-on-Tyne. This shipyard, originally laid down for the building of war vessels, has, since the war, been reconstructed as a mercantile yard, and recently a number of notable vessels have been built there. Among those of especial interest are:—The Cunard liners Ausonia and Ascania; the P. & O. liner Mongolia; the Great Eastern Railway steamer Malines; and the Bergen Steamship Co.'s passenger liner Leda, together with some of the largest oil tankers in existence, and a number of cargo boats and motorships fitted with Armstrong-Sulzer marine Diesel engines.

It was at this yard that the famous Cunarders Aquitania and Berengaria were recently re-conditioned and converted for oil burning with such gratifying results.

MAURETANIA'S GOOD WORK

To have crossed the Atlantic 275 times, safely carrying 375,000 passengers, and to have steamed over 1,000,000 miles (including war service), is a record of which the owners of any ship possessing it may well be proud. When the Mauretania reaches New York at the end of her present trip, which commenced on Saturday last when she left Southampton, she will have achieved this three-fold distinction, and the Cunard Company inform us that this is believed to be a world's record for any steamer in service today. Apart from her great speed—which is instanced by the fact that on 27 recent consecutive voyages she averaged 25½ knots—the Mauretania has achieved remarkable regularity of running, and the results of her annual overhaul, which has just been completed, show that there is every prospect of her retaining the blue riband of the Atlantic and maintaining her present proud position.—Syren & Shipping.

APPOINTMENTS TO C. G. M. M.

The following new appointments are issued from the office of the superintendent engineer, C. G. M. M.

J. G. Phillips to be chief engineer of S. S. "Canadian Warrior."

J. W. D. Cumming to be chief engineer of S. S. "Canadian Runner."

T. Coulter to be chief engineer of S. S. "Canadian Spinner."

Montreal.—A new high record for the number of ships in harbor at one time was established here on October 24, when 92 ocean and coasting vessels were berthed at the local wharves. This total, which does not take into account vessels from the Great Lakes, was made up of 88 ships from trans-Atlantic or American ports and 4 from ports in the Gulf of St. Lawrence. Since the opening of navigation to date the port has been visited by 1,033 ocean and coasting steamers, as compared with 964 arrivals from the sea during the whole of last year.

Propelling Machinery of Future Carriers

Ship Owners Are Faced With the Necessity of Modernizing Their Cargo Carrying Fleets, and the Choice of Propelling Equipment is a Leading Factor in the Vessel's Commercial Success

By JAMES RICHARDSON, B.Sc., M.I.C.E.

THE one pressing necessity to-day is the revitalising of industry, and in this process, the mercantile marine with its cargo carriers acts as the connecting link. When considering the question of cargo ships, the actual design of the ship, in respect of its dimensions and the general features of the hull, is more or less definitely prescribed by the speed, the cargo to be carried and handled, and the docks and harbours to be used by the vessel. It is not so, however, except so far as speed is concerned, with the propelling machinery. At no time in the history of marine propulsion have so many types been available to the ship owner, from which to choose. Nor is the problem of selection a matter of easy solution. Not only is the propelling and deck machinery of great importance as regards first cost representing from 25 per cent. to 40 per cent. of the total cost of the ship according to the design of ship, type of machinery, and the dividing line which is adopted as between propelling and deck machinery, but the economy and certainty of operation of this propelling machinery is a dominant factor in governing the margin between profit and loss.

The ship owners of the sea-going nations of the world are now faced with the necessity of increasing tonnage, although the total tonnage to-day available is generally in excess, certain classes being excepted, of the freight-carrying demands; yet the figures, which have recently and frequently been produced are misleading if taken at their face value. During the war, a considerable number of ships were pressed into services for which they were definitely unsuitable. Large additions of tonnage were also made in certain quarters without there being available either the requisite experience in construction or the necessary skill to manage the business side of ship owning and to operate the imperfectly constructed vessels. Furthermore, a number of the large shipowning concerns with well-established trades of long standing, having all the necessary organisation for carrying on their special business, are operating with fleets of diminished numbers of a greater average age than is consistent with maximum efficiency. In one case a fleet, the average age of which for maximum efficiency should not exceed 6 years, are operating with ships 12 years old as the average. A further fleet, the normal complement of which is 16 ships is only now composed of 6. These are merely given as typical examples. The latest official returns show that of all the vessels owned in the world 31.5 per cent. are over 20 years old and more than 20 per cent. are over 25 years old. As regards British ships the position is substantially the same. All these factors can only lead to the definite conclusion that there certainly must be a considerable amount of building of new tonnage in the near future.

The question, therefore, of the type of ship, as denoted by propelling machinery, naturally arises and in this connection a decision must be made regarding the fuel to be used, whether oil or coal. At sea, oil has proved to be the fuel par excellence. The improved conditions made possible with steam ships by the substitution of oil for coal are revolutionary, and for certain classes of steam ships and on certain routes, such as liners on the Transatlantic service, the savings due to oil fuel by way of greater speed of ship, less delays taking fuel on board enabling a greater number of voyages to be made per annum, and the great reduction in the stoke-hold personnel, have made oil fuel the standard, even although the actual cost of fuel per trip is considerably greater with oil than with coal.

What of the average cargo carrier? It can now definitely be stated that except in special cases the burning of oil fuel under boilers with the present prices ruling for coal and oil, is actually uneconomical. The advantages which hold in the case of the Atlantic liner have not now, with reduced wages, sufficient potency with the lesser powerer and slower cargo carrier to warrant the extra first cost of machinery and the higher price of fuel. The subjects of price, distribution and available supplies of oil fuel must be considered. As regards distribution little difficulty will now be encountered because oil fuel stations in numbers have been provided on all of the principal trade routes, and the ease with which this fuel can be accommodated on board ship and the 50 per cent. greater heat value per ton and 65 per cent. advantage per cubic foot makes possible for a given ship a very much greater radius of action, without rebunkering.

The price of oil fuel within the last 10 years has kept approximately the same position relative to coal, with an inclination recently, to be relatively cheaper. There is no sign of a reduction to such a figure that oil-burning under boilers for the average merchantman can compete with coal, excepting in very special cases where oil is relatively very cheap and coal dear. There is evidence that there will be available supplies of fuel to meet the demand, although the incentive of the high prices obtainable for petrols and lubricating oils will tend to cause producers to distill the crude oils to the maximum possible extent, having the effect of lowering the quality of Diesel and fuel oils coming on the markets.

Recently a number of tests ashore, followed up by actual trials under normal operating conditions at sea, have proved that the Diesel oil engine is not so sensitive to varying qualities of fuel oil, including high asphaltic bunker oils, as was earlier believed to be the case. As to whether the extra overhauling which the heavier and less easily combustible oils may well demand, counter-balances the savings in fuel costs, will emerge in time, but it is certain that the capacity to burn reasonably satisfactorily almost any grade of fuel oil in the market is unquestionably an added asset of considerable value, and will in the future be regarded as a necessity for ocean-going tramps.

Mention should be made of the recent developments of the Anglo-Persian oil group towards securing an all-British supply of fuel oil for the needs of the Empire, with their great plant at Swansea for distillation and refining. The effect of this enterprise should be in the direction of assuring supplies and reducing the price.

Under such circumstances as the foregoing, undoubtedly the Diesel oil engine, as the most economical consumer of liquid fuel, makes a most compelling appeal, requiring only from one-third to one-fifth the quantity of fuel used by equally powered steamers. The higher the power of the steamer the less favorable the case for the Diesel machinery on the score of fuel economy, but the fractions given will be found to be accurate when comparisons are limited to equal powers.

There is also a fascination in the thought that instead of there being any transformation of energy as with steam plant, the heat contents of the fuel are utilized by combustion actually within the engine itself, heating the air of the Diesel cycle, which on expanding directly produces energy at the propellor. Such simple thermo-dynamical change, resulting in three times the thermal efficiency of the steam cycle and direct application of the process of combustion will prevail.

The present position of the Diesel engine is gradually but surely strengthening. There are now available more

types of marine propelling plant of all kinds, and particularly of Diesel engines, than ever previously. Hitherto a reasonably full measure of success has been limited to those types of internal combustion machinery where conservatism in design and construction has been the key-note, but to-day newer developments on a boiler scale in internal combustion are gradually proving themselves at sea.

The Diesel engine recently has been thrown further into very strong relief by the troubles which have been experienced with double-reduction gearing. The maximum powers for which the Diesel engine can definitely be stated to be suitable are gradually increasing, and to-day 300 b.p.h. per cylinder, with 16 cylinders, i.e., two engines each of eight cylinders, a total of 4,800 b.p.h. or the equivalent of 5,500 steam indicated horse power total is the standard for the larger class of motor vessel. This range of power covers 96 per cent. in numbers and 88 per cent. in tonnage of ships under construction at the present time, and whilst making all allowances for the fact that the average to-day may give a smaller ship than normal, due to the limited number of large liners under construction, yet, it is seen that the field already covered as regards power is very considerable. Such powers as 5,500 equivalent steam i.h.p. still require twin screws with the Diesel engine. This aspect will be dealt with later.

The largest cylinder at sea still remains 700 b.h.p., but with the particular construction in this case of opposed pistons, the number of cylinders is limited to four. The time is not far distant when Diesel engines of 400 to 500 b.h.p. per cylinder, of various types and in numbers, will be operating at sea with success. Recent advances in materials and design, but more particularly in the latter direction, have succeeded in minimizing the heat flow through the material and the consequent stresses induced thereby by means of definitely controlled circulation of the cooling medium, so that with these increases in power, reliability will be unimpaired. The tendency, however, with increasing sizes will be to adopt fresh water cooling both for the pistons, cylinders and cylinder heads, so completely to obviate the chances of local heating and therefore of excessive stressing due to deposits of salt or sand. The extra complication of the coolers, circulated with salt water, for extracting the heat from the fresh water and of the extra pumps is a very minor matter compared with the security so attained.

The Diesel engine still remains a massive and somewhat complicated power plant, and no movement towards simplification has yet definitely set in. Undoubtedly, when shipowners and their superintendents have come to appreciate the principles of operations of this prime mover, a number of so-called "gadgets" at present introduced as safeguards, and in order to make assurance doubly sure, will be discarded. Only in this way does it seem possible definitely to attain greater simplicity. As regards reducing the mass of the engine, there are only two ways in which this can be achieved, either by increasing the mean effective pressure in the cylinders or the piston speed. The governing factor in the design of all internal-combustion engines is the heat flow factor. The greater the cylinder dimensions the more vital is this consideration. This factor, expressed in pounds of fuel consumed per sq. in. of combustion volume surface per unit of time, is directly dependent upon the piston speed and, for a constant factor of heat flow, the lower the piston speed the higher the mean effective pressure possible. The converse is equally true.

The tendency for some years past has been to reduce this heat flow factor with increasing size, but the gradual improvements in materials and designs which have permitted of increasing size, as already stated, now allow augmented heat flow, by increasing the mean effective pressure in the cylinders and the piston pin.

The piston speed with a single acting internal-combustion engine can well be considerably higher than with steam practice because of two considerations —firstly that the maximum pressure for which bearing surfaces are designed is only maintained for approximately 12½ per cent. in the case of four-stroke engines and 25 per cent. of the cycle for two-stroke engines, and secondly because the pressures on the bearing surfaces are not generally reversed as with double acting steam engines. The inclination, therefore, especially with four-cycle machinery is to increase piston speed. With twin-screw ships of relatively high speed revolutions higher than is usual with steam machinery can be adopted without impairing to any serious extent the overall propulsive efficiency. With single screw vessels, especially of low speed, the propeller speed must be kept low, and long stroke engines will increasingly be adopted to attain a high piston speed and good propeller efficiency.

One point that is not perhaps sufficiently emphasized, is, that with Diesel machinery, the higher the power per cylinder, the greater the weight per horse power, so that for a given power of ship, there is a definite saving in machinery weights when twin screw engines are adopted in comparison with single screw machinery. This saving in weights means a certain reduction in cost, although the lesser machinery cost is balanced by the increased cost of hull, due to the extra bossing of the stern and the two tunnels for the two lines of shafting. The chief advantage of single screw machinery lies in the reduction in personnel which is possible, as obviously an increased engine room complement is required to superintend and to manoeuvre two engines. Nevertheless, for powers above 2,000 to 3,000 shaft h. p., twin screw Diesel engines will be the rule for some time to come and are to be advocated.

The saving in fuel costs with Diesel machinery must be considered in conjunction with the lubricating oil consumption, which is higher than with steam machinery. At first, this subject was not perhaps fully appreciated, but to-day it can confidently be stated that with the latest internal-combustion machinery, the problems associated with the necessary lubrication of the piston rings and the forced feed to the main bearings have been most conscientiously attacked, and the consumption of lubricating oil has been reduced to a figure of relatively small importance. 1.5 gallons of lubricating oil for all purposes per ton of fuel oil consumed should be the relation, and has been attained.

Every ship can virtually be regarded as a floating community, and the propelling machinery is not by any means the only consideration. There are the various services, bilge and ballast, heating of cabins and the machinery for handling the ship, the capstan, and the steering gear and for cargo manipulation, the winches. How shall the auxiliaries be driven? So far as steering gear is concerned the electric-hydraulic system has proved itself efficient and is finding increasing favor even on steamships. For lights, fans, electricity is also required. For the heating of a ship, steam is still the most convenient and the least costly method, although either exhaust raised steam at sea and some combination of electrically generated heat and hot water pipes will no doubt find increasing favor in the future. Therefore for the remainder of the plant, such as winches and pumps, the choice lies between steam or electric drive. Where first cost is concerned, considerable advantage lies on the side of steam, but the more elegant solution and the more economical, from the point of fuel consumption, is undoubtedly the electric drive. Electric current is generated by Diesel driven dynamos, which, except in very special cases, should not be less in number than three. For reasons of interchangeability these three should be of the same size. One should be sufficient for normal sailing at sea, two are required for manoeuvring the ship or for working cargo in port, and one is always a stand-by. For ships of 3,000 tons deadweight, three sets each of 50 kw. suffice. From 6,000 tons to 10,000 tons deadweight, three sets of 80 kw. to 100 kw. are generally required. If special provision has to be made, for instance, for carrying refrigerated cargoes, the power of the sets is greatly increased, and in some cases, three or four sets of 150 kw. are called for. The consumption of fuel for working cargo and pumps in port with banked fires in a steamship is of the order of 10 times the amount of fuel required by the Diesel electric system of auxiliary working on similar motor ships.

The foregoing refers particularly to 4-cycle engined ships. When 2-cycle

machinery is adopted the practice of driving the scavenging pumps separately from the main engine to permit of rotary machines being used for this duty will undoubtedly gain favor, and in this case the Diesel-driven generators for supplying electric current for general duties, as well as for driving these blowers, become of very considerable size, approximately of 25 per cent. of the power of the main engine.

Such figures lead naturally to a consideration as to whether the correct angle from which to review and attack the problem is not to regard the machinery of the ship as a central electric power station delivering current to electric motors for propulsion and all the other multifarious duties. For special purpose ships, where the duties apart from propulsion require a substantial measure of the total power as, for instance, dredgers, ferry boats, cable ships, etc., the Diesel-electric system is being adopted and merits the closest attention. It is favored in America and has been regarded also, by virtue of the great sub-division possible, as a means of adopting the Diesel principle to ships of the highest power. It is heavy, the first cost is high, and electric machinery suitable for marine work requires a certain amount of development before it will prove quite as reliable as the remainder of the installation.

The motor ship has arrived to-day at the position where the shipowner has few remaining doubts as to the capacity of the oil engine. The three factors of first cost, personnel and upkeep are still regarded, in some quarters, as deterrents. The first cost for similar-sized steamers and motor ships is much in favor of the former. This is the general comparison made, although it is false. A smaller motor ship will suffice because of the saving of space due to the type of machinery, principally in bunkers, in increased radius of action per ton of fuel (although a motor ship must generally carry more fuel than a coal-fired steam ship to get full advantage of favorable fuel markets) and decreased personnel.

In inviting tenders shipowners would be well advised in order that they may accurately assess the position of the motor ship to state simply the duty of the ship and the sea speed required, leaving the contracting naval architect and marine engineer to decide the best combinations of features to meet the requirements at the minimum first cost. Such are the advantages of the motor ship, especially on certain and many important trade routes that the extra first cost is quickly written off.

The subjects of personnel and upkeep are interdependent. There is available an increasing number of engineers conversant with the first principles of internal combustion and most engine builders are only too anxious that their engineers who have worked on the construction of the machinery shall follow it to sea and form the nucleus of the engine room complement. Under such conditions the fears of excessive upkeep expenses are not well founded.

When next marine construction is energetically pursued, as undoubtedly it must be, if we are to maintain our natural and supreme position as a sea-going and trading nation, the motor ship will be in the forefront. To-day at sea the tonnage of motor ships is 6.5 times what it amounted to in 1914, and of the present total, more than one-half, or 848,000 tons, represents 149 vessels of over 3,000 tons. Of ships under construction at the present time those to be engined with internal combustion machinery form such a proportion as to make the future for this new type appear extremely bright.

The Control of Waste Fuel In Harbors

By BANCROFT HILL
Before the American Association of Port Authorities

One of the great problems that those who are charged with the regulation of harbors must face with the hoped-for return of shipping, is the regulation of waste fuel oil disposal. Two years ago, when shipping was being carried on with feverish activity, the cry went up from one end of the country to the other, that waste fuel oil added a very grave fire hazard in harbors, that it killed fish, oysters and ducks in rivers and bays, and that it ruining bathing beaches and resorts. Several bad harbor fires were attributed directly to this oil. From New Orleans it was reported that a disastrous fire was caused by the dropping of a red-hot rivet into water covered with this oil. In Baltimore a fire spread rapidly under one pier and burnt an adjacent one, because of the presence of oil. Along bays and rivers we heard of ducks dying because their wings were coated with oil so that they could not fly. Fisherman reported that part of the oil sank to the bottom, killing fish and oysters. At Atlantic City, Virginia Beach and other coast resorts, it was necessary to furnish gasoline or kerosene to the bathers so that they could get the fuel oil off when leaving the water. From reports which have been coming in since, the European ports were having much the same trouble.

This condition resulted in a certain amount of unco-ordinated effort to suppress the menace. Mr. Appleby, of New Jersey, introduced a Resolution in Congress authorizing the President to call a conference of all the Maritime Nations to devise means "for the prevention of the pollution of navigable waters" outside of the three-mile limit. A Bill was also introduced to prevent pollution of navigable waters under the jurisdiction of the United States. From the testimony offered at the hearings on these Bills, it appears that the passage of the first was retarded because of the enormous inertia of International Conferences, and the second because its provisions were so broad that they affected the discharge of trade wastes and also the mine water on account of its sulphuric acid contents. There was also some local legislation and some attempts to remedy the existing conditions by use of laws already in effect. The results, however, were not very satisfactory, owing to the difficulty of enforcing the various laws.

Conditions now appear to be much better than they were two years ago, but unfortunately most of this improvement is due to the large decrease in the number of ships in operation and very little to the attempts at prevention. With the hoped-for improvement in shipping we will have this problem on our hands again, or rather the problem will become much graver, as we have never been free from it since oil burners were used, and I feel that now is the time to prepare for it. It is for this reason that I present this subject for discussion, not so much to set forth a solution, as my own port is still working on it, but to gain the benefit of your discussion and to give you the results of our experience here for whatever they may be worth.

There have been several discussions of this question. One of the best which I have seen was by the Engineering Staff of the National Board of Fire Underwriters and appeared in World Ports, August, 1921. The main point of that article was an appeal for more laws, both local and federal, and a sample law was set forth. Baltimore has already taken this step, as will appear from the account of our work. Obtaining the law is only the first and easiest step. We have then two problems to solve—making it easy to obey the law, and enforcing the law. How great these difficulties are, will appear from the following account of our work in Baltimore Harbor:

Baltimore has ideal harbor conditions for ocean traffic terminals. There is practically no tide (less than 1.5 ft.) and therefore no tidal current. We are at the head of navigation and there is little river current. Although we do

have this tremendous advantage over many other ports, it makes the work of keeping the harbor clean much more difficult. Anything that falls into this harbor stays in until it is lifted out by hand, derrick or dredge. It would seem therefore that the lessons learned and experience gained in keeping this harbor clean would be of interest elsewhere.

The question of oil regulation first was brought up about two years ago, when the harbor was found, one morning, covered with oil. On investigation, it was discovered that a junk dealer had been "given" 10,000 gallons of oil by a boiler scaler. This oil had been taken from the tanks of a steamer which was about to go to dry dock. It was placed in an old hull, which sank in the night and let the whole 10,000 gallons loose in the harbor.

About the same time there was a bad fire on the water-front. The Fire Department stated that the destruction was doubled because the fire ran under the pier upon which they were working, by means of a heavy oil deposit, and set fire to another pier, which was also burnt.

The Fire Department and the Harbor Board, working together, had a law passed imposing a fine of $100.00 on anyone convicted of allowing oil to enter the harbor in any manner. Copies of this law were printed and given to the captain of each ship as it entered the port. In spite of the difficulty of getting evidence which would stand in court, we secured a large number of convictions. In one week we had the officers of three vessels fined the maximum amount. There was a great reduction in the amount of oil and conditions were much improved. It then appeared that our fine was not heavy enough, as it was openly stated that it was cheaper to pay the fine than to dispose of the oil, and it was increased to $500.00 and thirty days in jail.

We now have two cases committed by the Police Magistrate for the action of the Grand Jury. One of these is the United States Shipping Board, which brings up an interesting point in connection with the Federal law on this subject. Acting under the Federal Statute of 1899, complaints have been made by the Department of Docks of the City of New York against vessels of the United States Shipping Board pumping oil. The following is an account of the results by Mr. Murray Hulbert, Commissioner of Docks. It is taken from the hearings of the Committee on Foreign Affairs, of the House of Representatives of the Sixty-seventh Congress, February 1922.

"Complaints have been made against a number of vessels in New York for discharging oil very deliberately into the waters of the harbor. It developed that these vessels were owned by the United States Shipping Board but operated for their account by private operators. One case came into Court, and the United States District Attorney said that if a fine of $500.00 were imposed the Government would get only one-half of it and the other half would go to the complainant, while the Government would have to pay all of it because the operator would charge it up to the Shipping Board." The case was therefore dismissed.

In the light of the above it would appear that a good local law was sufficient. We have such a law, and it ought to be easy for anyone to obtain such a law. You have but to write your law and notify the Yacht, Rowing and Motorboat Clubs that you need their help. The heartfelt anguish which they will pour out will move any legislator. The law is the smallest part of the work in keeping a harbor free from oil. The work lies in enforcing the law. This work will divide itself into two parts.

First, actually making an effort to arrest and convict any person responsible for oil entering the harbor, and, second, offering such facilities as will make it easy to obey the law. It is very difficult to enforce a law which is hard to obey. Along with the work of preventing waste oil from going overboard, must go the provision of facilities, either free or at cost, for the legal disposal of this waste.

In this harbor we have one inspector whose work is to watch for evidences of violations by examining the sides of ships from the piers and wharves and to examine into the evidence when anyone reports a violation. One of our boats makes a round of the harbor every day and examines the off side of the vessels at piers and both sides of the vessels at anchor. The Fire Department officials report to us any information which they may pick up and the harbor police make arrests when they can. All the employees of the Harbor Board watch for violations, and a record is kept of the date, position and quantity of any oil found in the harbor.

We are now building an apparatus for cleaning the oil off the water when we find any quantity of it. This apparatus will consist of a pump and a settling tank with pipes for sucking up the oil and water from the surface and conveying it to the settling tank, where the oil will rise to the surface and be drawn off for storage in barrels. It will be mounted on a scow. By doing all these things we keep the harbor in a fair degree of cleanliness under the present condition of inactivity in shipping. When shipping increases it will be more difficult to maintain satisfactory conditions, and for that reason we are working towards a better method of controlling this waste oil.

The only method which seems to offer any real security is to have inspection made of every oil burning boat as it enters the harbor and a report made as to the presence of oil in her tanks and bilges, and to follow this up with inspections at intervals based on the amount of oil present and the character of the boat. This method may seem a little severe, but there is apparently no alternative if we are to really control this nuisance. We have found cases where oil was standing in the valves of the ship's bilges blows, was fresh down the side, was all over the slip, and from previous inspections we knew that the oil had been pumped during the preceding night, but when we could not swear to seeing it enter the water, and the Chief Engineer solemnly swore that he had not moved a pump for two months, the case was dismissed. We had a case where oil was found bubbling up around a ship. In the absence of an oil well, there was no other place for it to came from but this one ship. The ship was an oil burner, she was working her bilge pumps, but when the Chief Engineer swore that there was no oil being pumped out, we lost our case because we could not see the oil as it left the ship.

When cases such as these are considered, and also the ease with which a ship can pump out at night, it is apparent that the only way to control this oil is to keep account of it from the time when it enters the port to the time when it is disposed of or the vessel leaves port. This will also automatically answer the question of how to control the shipyards and boiler scalers, who are probably responsible, for reasons given below, for as much of this trouble as the ship's crews. When an oil burner goes to the repair yard to have her tanks cleaned, scaled, caulked or repaired, a large amount of oil must be disposed of. This oil is not fit for use, as it is full of scale and water and has had most of the life roasted out of it by steam coils, which are used to heat the oil to make it flow. The Chief Engineer of one of our largest shipyards estimated that there were 5,000 barrels a year in his yard alone that must be removed. The Superintendent estimated 20,000 barrels. Theoretically, they disposed of this stuff by hiring a dredging company to put it on scows and tow it to a marsh, where it was burnt. Practically large quantities of it got into the water.

As to the second part of the question, the legitimate disposal of this oil, there seems to be only one method practicable. The oil must be collected from ships in barges in the same way that garbage and ashes are collected. It must then be burnt. It would seem that some practical use could be made of it, but so far we have not discovered any. We have experimented by mixing this oil with sawdust and putting it in a furnace. It bubbled and steamed but did not burn. We mixed it with sand and tried to use it for paving, but it would not solidify. The fact that a shipyard would give away 10,000 gallons at one time is evidence of its present low value. It is my hope that there will be a discussion of this problem at the Convention of the American Association of Port Authorities, and that, out of the large and varied experience of the members, we may get information which will be of help to us all in meeting what may soon become a serious menace.

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The Shipping Situation

THE ANNUAL report of Lloyd's Register just issued, and printed elsewhere in this magazine, contains as usual a very thorough and authoritative resume of the world shipping position. It calls attention to the fact that there are at present afloat fifteen million tons of shipping in excess of the pre-war fleets. There is a goodly proportion of this tonnage, of course, which is of a good age and, under other circumstances, would probably have been broken up or retired from service in favor of newer craft. The prohibitive cost of building has, however, prevented many shipowners from building the new tonnage that they would have done. The old ships might not be able to compete successfully when trade resumes its usual standard, and when that happy day arrives, there will doubtless be considerable activity in the shipbuilding industry. As things stand at present, the berths made vacant by the completion of contracts remain vacant, except for such of them as are engaged in building the new passenger vessels still required to bring passenger fleets up to date.

As was expected, the United Kingdom has resumed her place of priority among the shipbuilding nations of the world, and of the six hundred and twenty-three new ships built during the year under review, four hundred and six were built in U. K. yards. Of these three hundred and seven were for British ownership, the balance being divided among the other British Dominions. It is interesting to note that over 55 per cent. of the new vessels built were fitted for burning oil, and the total tonnage now so fitted has increased from 1,310,209 in 1914 to 14,464,162 in the year just reviewed.

A still more notable increase is in the number of vessels fitted with internal combustion engines, which have increased from 297 of 234,287 tons in 1914, to 1,620, of 1,542,160 in 1922.

It is interesting to note that a committee from Lloyd's Register is co-operating with the British Board of Trade with a view to formulating new rules for the construction of water tube boilers, and the report of the committee is expected to be available very shortly.

The report of the Society is issued in convenient book form, and is well worthy the perusal of anyone interested in shipping. The ramifications of the Society are world wide, and the importance of the work carried on by them is impossible to over estimate. When it is stated that the total tonnage of vessels coming under the classification of the Society was at the end of June, 1922, in excess of 27,000,000 tons, some idea of the magnitude of their operations can be gained.

Reciprocating Engine Still Leads

NOTWITHSTANDING the large amount of publicity received by the steam turbine, and internal combustion engine, and the decided gains they are making from year to year, the place of honor occupied by the tried and trusted reciprocating engine is still firmly held. Out of a tonnage of 2,527,513 gross tons classed by Lloyd's in the years 1921 and 1922, 1,420,924 tons had the old style engines fitted, while 870,037 tons were fitted with geared turbines, and 226,552 received internal combustion installations.

Out of a total tonnage of 61,342,952 recorded in the latest edition of Lloyd's Register of Shipping, the steam reciprocating engine is in use in no less than 51,653,324 tons, while the steam turbine is represented by 8,149,165 tons, and the internal combustion engine by 1,540,463 tons.

It will thus be seen that there is a long long way to go before the reciprocating engine is driven from the seas, and it is quite natural that the bulk of shipowners, whose vessels are engaged in trading to all the out of the way corners of the world as well as the more travelled routes, should hesitate before changing over to the new prime movers. The average tramp fitted with a triple expansion engine, represents about as simple and reliable a marine power plant as can be obtained. Ordinarily she is fitted with two main boilers and a donkey boiler for use in port, while the engine room auxiliaries consist of a dynamo, a ballast pump, and a general service pump. Bilge and circulating pumps, and very often the feed pumps too, are fitted to work from the main engines, though it is usual now for the feed pumps to be independent of the main engines. Repairs and maintenance in such a power plant are cut down to the minimum, and they can remain away from their home ports for years at a stretch with no further repairs than can be effected by the ship's engineers.

There has been a certain amount of trouble with the geared turbine, which has not yet been eliminated, and in regard to which a certain difference of opinion prevails among leading engineers. The internal combustion engine is gradually proving its reliability, and showing some fine performances, but neither the geared turbine nor the internal combustion engine have the record that the reciprocating engine has. It is cheap in first cost, economical of fuel, and will continue to work even when comparatively serious defects have developed. Those of us who have spent years at sea with the triple expansion engine, will watch with some regret its gradual elimination, for there is no reason to doubt, that hard as it may be to displace it, that displacement must eventually occur. "The old order changeth, giving place to new," and while as engineers we encourage the development of all new things, in the interest of progress, yet we must ever retain a soft spot in our hearts for a tried and proven servant, such as the reciprocating engine has been since its adoption.

Latest Movements of the C. G. M. M.

Steamer and Voyage	Sailed From	Arrived At	Sailed From	Arrived At	Mont'l, Nov.13. Routed.
Adventur'r (3)	Goderich Nov. 8	Ft. William Nov. 11			Goderich, Ft. William
Aviator (15)			Montreal Nov. 5		
Beaver (15)	Montreal Oct. 12		Barbadoes Nov. 7		Montreal, Barbados, Trinidad, Demerara, Halifax.
Britisher (3)	Vanc'r Oct. 27	Psd. Flattery			Vanc'r, Auckland.
Carrier (10)			Montreal Nov. 12		
Challenger (5)	Mont'l Sept. 30	Colon Oct. 18	Panama Oct. 19		Montreal Sydney, C.B., Australia, N. Zealand.
Coaster (10)	Mont'l Nov. 8		Quebec Psd. Fame Pt. Nov. 10	Nov. 11	Montreal, Quebec, Barbados, Trinidad Demerara.
Command'r (9)			Montreal Nov. 3		
Conqueror (8)	Mont'l Sept. 9	Brisbane Nov. 8			Montreal, Sydney, N.S. Brisbane.
Construc'r (3)	Mont'l Nov. 6	Quebec Nov. 7	Quebec Psd. Fath. Pt. Nov. 9	Nov. 9	Mont'l, Quebec, London, Rotterdam.
Cruiser (4)	Mont'l Oct. 20	Sunderland Nov. 10			Mont'l, Quebec, London, Sunderland.
Engineer (2)			Goderich Nov. 10		
Explorer (6)	Mont'l July 29	Auckland Nov. 5	Auckland Nov. 10		Montreal, Sydney, Australia, New Zealand, Rarotonga, Papeete, New York.
Farmer (22)			Vancouver Nov. 12		
Fisher (16)	Mont'l Oct. 26	Kingston Nov. 10	Kingston Nov. 11		Montreal, Bermuda, Nassau, Kingston, Belize, Montreal.
Forester (15)	Mont'l Oct. 6	Bermuda Nov. 4	Bermuda Psd. Quebec Nov. 4	Nov. 12	Montreal, Bermuda, Nassau, Kingston, Belize, Montreal.
Freighter (4)	Vanc'r Sept. 7	Bombay Oct. 21	Bombay Oct. 31		Vanc'r, Yokohama, Bombay, Pt. Sudan
Gunner	Mont'l Sept. 13.	Pt. Colborne Nov. 1			Mont'l, Richibucto, St Anne des Monts, Waddington, Pt. Colborne.
Harvest'r (10)			Montreal Nov. 8		
Highland'r (6)	Vanc'r Nov. 10				Vanc'r, Newcastle, Sydney, Melbourne, Adelaide.
Hunter (11)			Montreal Oct. 23		
Importer (6)	Vanc'r June 13		Colombo		Vanc'r, Miike, Bombay, Madras, Baissoir, Saigon, Singapore, Cuba.
Inventor (6)	Vanc'r Sept. 6		Moji Oct. 25		Vanc'r, Yokohama, Kobe, Shangh'i Tientsin, Moji, Vancouver.
Leader (4)	Mont'l Oct. 11	London Oct. 28	London Nov. 4		Montreal, London, Mont'l.
Logger (8)	Mont'l Oct. 26	Trinidad Nov. 9	Trinidad Nov. 10		Montreal, Barbados, Trinidad, Demerara, Montreal.
Mariner (8)	Mont'l Oct. 5	Glasgow Oct. 24	Glasgow Oct. 21	Psd. Father Pt. Nov. 12	Mont'l, Liverpool, Glasgow, Quebec, Mont'l
Miller (13)	Montreal Nov. 10	Psd. Fame Pt. Nov. 12			Mont'l, Liverpool.
Navigat'r (18)	Mont'l Nov. 8	Psd. Belle Isle Nov. 12			Montreal, Cardiff; Swansea.
Observer (24)	Vanc'r Oct. 25	Oc. Falls Nov. 3	Oc. Falls Nov. 6		Vanc'r, Blaineys, Nanaimo, Oc. Falls, Pr. Rupert, Ocean Falls.
Otter (11)	Mont'l Sept. 30	Swansea Oct. 23	Swansea Nov. 4		Montreal, London, Swansea, Montreal.
Pathfinder (4)	Goderich Nov. 10				Goderich, Fort William.
Pioneer (10)	Mont'l Oct. 22	Ceylon Nov. 7	Panama Nov. 8		Montreal, Sydney, N.S., Australia.
Planter (5)			Montreal Oct. 29		
Prospect'r (8)	Vanc'r Oct. 27	Psd. Flattery Oct. 23			Vanc'r, Yokohama.
Ranger (18)	Mont'l Nov. 2	Psd. Belle Isle Nov. 6			Mont'l, Liverpool.
Rover (20)	Vanc'r Nov. 7	Nanaimo Nov. 8	Nanaimo Nov. 9		Vanc'r, Blaineys, Nanaimo, Oc. Falls.
Runner (12)	Mont'l Oct. 21	Cardiff Nov. 8			Montreal, Cardiff, Swansea.
Sailor (3)			Goderich Nov. 11		
Sapper (33)	Mont'l Nov. 4	St. John's Nov. 12			Mont'l Charlottetown, St. John's.
Scottish (3)	Vanc'r Sept. 8	Newcastle Nov. 8			Vanc'r Auckland, Sydney, Kembla, Melbourne, Geelong, Newcastle.
Seigneur (14)	Mont'l Sept. 18	Garston Oct. 15	Garston Oct. 26	St. John's Nov. 1	Mont'l, Liverpool, Birkenhead, Garston.
Signaller	Montreal Nov. 11				Mont'l, Waddington.

Skirmisher	(4)	Vanc'r Nov. 10	Fraser Mills Nov. 10		Vanc'r, Fraser Mills.	
Sower	(3)	Pt. McNichol Nov. 11			Pt. McNichol, Ft. William.	
Spinner	(9)	Mont'l Oct. 28	Psd. Cape Race Nov. 3		Mont'l, Liverpool.	
Squatter	(11)	Mont'l Oct. 28	Psd. Cape Race Nov. 3		Mont'l, Glasgow.	
Trader	(3)			Goderich Nov. 12		
Transp'rt'r	(3)	Vanc'r Sept. 19	Melbourne Nov. 9		Vanc'r, Honolulu, Australia New Zealand.	
Traveller	(4)	Vanc'r Aug. 12	Fiji Nov. 3	Fiji Nov. 8	Vanc'r, Australia, N. Zealand, Suva, Fiji.	
Victor	(8)	Mont'l July 4	Auckland Oct. 8	Auckland Oct. 13	Montreal, Australia, N. Zealand.	
Volunt'r	(15)	Mont'l Oct. 14	Swansea Nov. 10		Montreal, Cardiff, Swansea.	
Warrior		Mont'l Oct. 29	Newcastle Nov. 2		Mont'l, Newcastle, N. B., Waddington.	
Winner	(7)	Vanc'r Nov. 4			Vanc'r, Yokohama.	
Sheba		Mont'l Sept. 9	Levis Nov. 7	Levis Nov. 11	Mont'l, Levis, Little Bras d' Or.	
Tolmie	(2)	Vanc'r July 10	Newcastle Oct. 11	Newcastle Nov. 1	Vanc'r, Australia, N. Zealand.	
Raider	(12)	-	-	-	-	Montreal, May. 16.
Rancher	(9)	-	-	-	-	Montreal, May 17
Trooper	(14)	-	-	-	-	Montreal July 8
Trapper	(12)	-	-	-	-	Montreal June 23
Drummond	(7)	-	-	-	-	Collingwood June 9
McKee	(4)	-	-	-	-	Goderich Dec. 12
Miner	(18)	-	-	-	-	Halifax Nov. 25
Sealer	(14)	-	-	-	-	Halifax Dec. 20
Settler	(11)	-	-	-	-	Halifax Jan. 13
Voyageur	(12)	-	-	-	-	Halifax Dec. 15

NEW MOTOR PASSENGER LINER

It is understood according to a statement by H. M. Trade Commissioner at Toronto that the Union Steamship Company, of New Zealand, has recently placed an order with the Fairfield Shipbuilding and Engineering Company for a motor passenger liner 600 ft. in length with a beam of 72 ft., and a displacement of approximately 22,000 tons, to be equipped with triple screws driven by Diesel engines, with a total horsepower of some 13,000. This represents a remarkable step forward in regard to motor ship development, as the ship when built will greatly exceed in size and horsepower any other motor ship at present afloat.

NEW CABLE STEAMER

The "Marie Louise Mackay," a twin screw telegraph cable repairing steamer, which has been built and engined by Swan, Hunter, & Wigham Richardson Ltd., at their Neptune Works, Newcastle-on-Tyne, for the Commercial Cable Co. Ltd. of New York, has recently left the Tyne.

The steamer is built of steel, being about 245 feet in length by 34 feet in breadth by 24 ft. 6 in. in depth.

She has three cable tanks for the carriage of the submarine cable, all placed forward of the propelling machinery and having a total coiling capacity of about 18,000 cu. ft. and a hold forward arranged for the storage of cable stores, etc., etc. The machinery for working the cables has been supplied by the Telegraph Construction and Maintenance Co. Ltd. and is of their latest design; it includes picking up and paying-out gears, Lucas dynamometers, and a Lucas patent sounding machine. Three large cable sheaves are fitted to the graceful overhanging bow.

Arrangements have been made for the carriage of water ballast in both the fore and after peaks and in the double bottom, whilst the oil fuel is carried in a cross bunker and is of sufficient capacity for a cruise of 6,000 miles.

The comfort of the staff on board has been the object of special consideration in designing the accommodation of the vessel. A large glazed shelter on the navigating bridge may be specially mentioned, where all on duty there are well protected from bad weather. The captain's accommodation is on the navigating bridge, whilst the rooms for the navigating and cable officers are on the awning and main decks midships, including a very comfortable dining saloon amidships; whilst the petty officers, cablemen and seamen are on the main deck aft.

The steamer is also fitted with an installation of wireless telegraphy, ample ventilation, steam heating, electric light and bells, telephones, etc., etc. There is a refrigerating room aft for the ship's use, as well as ample storeroom accommodation.

The auxiliary machinery for navigating and working the vessel is of the most improved pattern, including specially designed steam windlass forward and steam capstan aft, steam winch, steam boat hoist, steam steering gear, motorboat, etc., etc.

The propelling machinery, which has been constructed by Swan, Hunter, & Wigham Richardson, Ltd., at their Neptune Engine Works, Newcastle-on-Tyne, consists of twin screw triple expansion engines, supplied with steam from two boilers, working under Howden's system of forced draft, and fitted to burn oil fuel on the Wallsend-Howden system.

When the vessel was at sea for her trial trip, everything worked without the slightest hitch, giving entire satisfaction to all concerned, attaining a speed of 12 knots per hour.

The vessel which has been built under the supervision of Capt. F. H. Lardner, O.B.E., is the second cable steamer recently built at the Neptune works for the Commercial Cable Co. The other, a much larger steamer, called the "John W. Mackay," has made a very successful beginning to her career since her delivery to her owners early in June this year.

Oswego, N. Y.:—News has been received that the steam barge "Molton" is ashore on the Main Duck Islands in the middle of Lake Ontario, although no facts have as yet been obtained, owing to communication being cut off. The only way of reaching these islands is by boat. The wreck is about thirty miles from either Oswego or Kingston. The barge belongs to the Mathews Steamship Co. and is commanded by Capt. G. A. Smith of Toronto. She was bound for Buffalo from Montreal light.

Vancouver.—There has been an increase in the movement of the crop via the western route this season over previous years, according to local grain officials. For the two months of September and October of this season the Canadian Pacific has moved 2.482 cars to Vancouver, carrying 3,680,806 bushels. Of that grain taken by rail to the coast, a total of 100,000 bushels have been shipped to the Orient and 1,000,000 bushels to the United Kingdom ports.

Lloyd's Annual Review of Shipping 1921-1922

New Tonnage Shows a Decline, While There is an Increase in Oil-Using Ships—The Various Activities of the Great Classification Are Discussed in Detail

THE ANNUAL report of Lloyd's Register for 1921-22 opens by calling attention to the fact that the world-wide depression in shipbuilding is reflected in the fact that during the year under review only 2,523,992 tons of shipping received the Society's classification, as against an average of 3¾ million tons per annum for the first three post-war years, 1918-21.

It is pointed out that the tonnage now afloat exceeds the pre-war mercantile tonnage by some 15,000,000 tons. "Doubtless these figures," it is remarked, "include many vessels which, on account of age or for other reasons, are not likely to be able, even when trade revives, to enter successfully into competition for freights; and it is perhaps not possible to determine whether, given the restoration of normal conditions, the tonnage now afloat would be found to exceed the demand."

As to the prospects of revival, the Report is not optimistic, for although at the time of writing the Report, "there are in some directions signs which may be indicative of a possible recovery in the shipbuilding industry," the Report goes on to say that "it will take much more than is at present on the horizon to enable builders to have any confident expectation of refilling the berths which are left vacant by the completion of tonnage now in hand; and, with the world outlook as it is, it would seem that the only consideration which would dispose shipowners to make themselves responsible for outlay on new tonnage, except as regards passenger liners and vessels intended for special trades, would be the knowledge that there will be a sharp demand for the most up-to-date types as soon as the upward movement of freights begins, in order to meet the severe competition which must then arise."

The report continues:—

The total of new tonnage to which classes have been assigned by the Committee of Lloyd's Register during the year ended June 30, 1922, amounts to 623 vessels, of 2,523,992 tons gross, a reduction of 22 per cent. on the figures for the preceding twelve months. This tonnage is well in excess of the highest figure recorded (in 1913-14) in pre-war years.

The Society's returns show, further, that at the end of June last 464 vessels, of 2,010,912 tons gross, were being built throughout the world under the special survey of Lloyd's Register, with a view to classification in the Society's Register Book. Included in this total, however, were 526,592 tons upon which work was suspended for one reason or another, so that the tonnage to be classed by the Society actually under construction at that time was approximately 1,484,320 tons gross. In view of the exceptional paucity of new orders during the past year, this figure is likely to suffer further reduction, unless an early stimulus to international trade should be forthcoming.

Plans Of Vessels Passed

The number of plans for new vessels passed by the Society during the year inevitably reflects the prevailing conditions. The figures comprise only 138 vessels, of 230,920 tons, and are the lowest recorded for more than 35 years. The countries in which the majority of the 623 vessels classed by Lloyd's Register during the year have been built are shown in the following statement:—

Where Built.	No.	Tons Gross.
United Kingdom ..	406	1,536,423
United States	45	286,539
Holland	44	159,184
Japan	26	152,524

The nationality of the principal proprietors of the new tonnage is more widely distributed, as will be seen below:—

Where Owned.	No.	Tons Gross.
United Kingdom ..	307	1,089,574
Holland	50	248,400
United States	37	231,133
Japan	26	152,524
Italy	22	144 406
France	34	137,332
Norway	30	135,432
British Dominions .	35	125,853

For purposes of comparison, particulars of the new tonnage classed by the Society during the last nine years (including the record pre-war period) are appended:—

	Steam & Motor.	Sail	Total.
Year	Tons	Tons.	Tons.
1913-14 ..	2,014,397	5,788	2,020,185
1914-15 ..	1,289,827	5,796	1,295,623
1915-16 ..	789,688	521	790,209
1916-17 ..	1,371,915	4,210	1,376,125
1917-18 ..	2,552,607	16,517	2,569,124
1918-19 ..	3,760,806	40,415	3,801,221
1919-20 ..	4,186,882	66,641	4,253,523
1920-21 ..	3,229,118	15,943	3,245,130
1921-22 ..	2,517,513	6,479	2,523,992

Total Ships Classed

The total tonnage of merchant vessels afloat at the end of June, 1922, holding the classification of Lloyd's Register, exceeds 27,000,000 tons, and is the highest figure ever recorded. Details follow, and it should be noted that motor vessels and sailing vessels fitted with auxiliary power are included in the figures shown for steamers:—

	British.		Other Countries.	
Material	No.	Tons Gr.	No.	Tons Gr.
Steel and Iron—				
Steam	5,573	13,550,973	3,770	12,887,454
Sail ..	155	120,138	255	395,273
Wood and Composite—				
Steam & Sail	150	53,446	126	223,840
	5,878	13,724,562	4,151	13,506,567

To these figures should be added 296 vessels, of 1,524,013 tons, which appear in the Register Book with the notation "Class Contemplated." A large number of these were completed and classed during the printing of the Register Book, while the construction of the remainder has been far advanced. The aggregate of shipping coming under the aegis of Lloyd's Register's classification, therefore, comprises 10,325 vessels, of more than 28¾ million tons gross.

Included among the vessels built during the year which have received the Society's classification are 32 exceeding 10,000 tons each, as compared with only 10 falling within this category during the previous twelve months. Of these 32 vessels, 23 are between 10,000 and 15,000 tons, while the following nine each exceed the latter measurement, viz.:—

Name	Tons Gr.	Owners.
Guilio Cesare	(21848)	Nav. Gen. Italiana.
Empress of Canada	(21,517)	C.P.R. Co.
Scythia	(19,730)	Cunard Co., Ltd.
Laconia	(19,680)	Cunard Co., Ltd.
Samaria	(19,602)	Cunard Co., Ltd.
Conte Rosso	(18,017)	Lloyd Sabaudo.
Montcalm	(16,418)	C.P.R. Co.
Montrose	(16,402)	C.P.R. Co.
Tyrrhenia	(16,243)	Cunard Co., Ltd.

Steam turbines were installed in 98 vessels, of 870,037 tons. These include a large number of ships of over 10,000 tons each, and all those of over 15,000 tons, classed by the Society during the past year. In each case the turbines are used in association with reduction gearing, and included in the figures is one vessel (steamship Biyo Maru, 5,480 tons) in which the turbo-electric drive is employed. In this connection it may be of interest to note that, of all steamers recorded in the current edition of Lloyd's Register Book, reduction-geared steam turbines are fitted in 918 vessels, of 5,519,357 tons gross. The majority of these gears are of the double reduction type.

The Isherwood system of longitudinal framing was adopted in the construction of 87 vessels, of 566,556 tons gross,

built under the Society's survey during the year. The majority of these, viz.:—69 vessels, of 471,992 tons, are intended for the carriage of oil in bulk.

Demand For Oil Carriers

Vessels of all types of construction intended for bulk oil carrying and built to class in the last 12 months amounted to 114, of 602,399 tons gross. While this tonnage is somewhat lower than the similar figure for the previous year, it represents an appreciably higher percentage (nearly 24 per cent., as compared with 18 per cent.) of the total tonnage classed during the period in question. The progressive demand for oil-carrying vessels is shown in the subjoined particulars of all such vessels recorded in Lloyd's Register Book for the years mentioned:—

Register Book.	Oil Tankers.* Tons gross.
July, 1914	1,478,988
July, 1919	2,929,113
July, 1920	3,354,314
July, 1921	4,418,688
July, 1922	5,062,699

*Steamers and Motors.

Oil Fuel Burners

Vessels to the number of 209, representing 1,395,929 tons gross—or 55 per cent. of the total tonnage of new vessels classed during the year under review—were fitted for burning oil fuel. The following table shows the gross tonnage of vessels either originally fitted to burn oil fuel or subsequently converted for that purpose. The figures represent all such vessels recorded in the Society's Register Book, and for the sake of comparison those for the year 1914 are also included:—

Register Book.	Vessels*
July, 1914	1,310,209
July, 1919	5,336,678
July, 1920	9,359,334
July, 1921	12,796,635
July, 1922	14,464,162

*Fitted for burning Oil Fuel.

These figures include vessels which are fitted with installations for burning oil in the furnaces of their boilers, but it does not necessarily follow that all such vessels are using oil. A number of such installations can readily be replaced on occasion by coal-burning fittings when oil is unobtainable or when its price, compared with coal, is so great as to render its use unprofitable. Among the vessels converted during the year, under the Society's supervision, for burning oil fuel, were the Aquitania, Berengaria and Mauretania, and several other large passenger vessels.

The total number of vessels built to class during the year and fitted with oil engines was 59, of 226,404 tons, 21 of which were ships of large size, totalling 168,476 tons gross. All these vessels were fitted with engines using heavy oil. The use of internal combustion engines continues to develop as the following [illegible] show:—

Recorded in Reg.	No.	Tons gross.
July, 1914	297	234,287
July, 1919	912	752,606
July, 1920	1,178	955,810
July, 1921	1,473	1,248,800
July, 1922	1,620	1,542,160

Of the 1,620 motor vessels mentioned in the above table for the current year, 341 are of 1,000 tons and upwards. Of these, 130 have tonnages ranging from 1,000 to 2,000 tons; 98 are from 2,001 to 4,000 tons; 47 are from 4,001 to 6,000 tons. Nearly one-half of the smaller vessels depend solely on their engines for their motive power. Among the 341 vessels of 1,000 tons and above, 93 are provided with considerable sail power, and are recorded in the Register Book as "auxiliaries." Of these, 13 are from 1,000 to 1,300 tons; 19 from 1,301 to 1,500 tons; 29 from 1,501 to 1,800 tons; 12 from 1,800 to 2,000 tons; and 20 are above 2,000 tons. There are 229 vessels fitted with oil engines of the Diesel and "opposed piston" types, and of these 64 are single-screw vessels. The largest of the vessels fitted with Diesel engines are the following:—Zoppot, 9,932 tons gross; Glenoble, 9,513 tons gross; Glenapp, 9,503 tons gross; Glenbeg, 9,461 tons gross; Glengarry, 9,460 tons gross; and Lochkatrine, 9,409 tons gross. It should be noted that the engines of the Zoppot are of considerably less horse-power than those of the other vessels mentioned.

Of the types of Diesel engines fitted, the four-stroke cycle predominates in numbers and total horse-power; but the two-stroke cycle is well represented, and some "opposed piston" oil engines have also been fitted. Some double-acting Diesel engines are under construction.

A set of "Still" engines, which are a combination of oil and steam engines, is at present under construction. The specified total brake horse-power of these engines is 2,500, and they are intended to be fitted in a twin-screw vessel of 450 ft. length.

Types Of Engines

The following table, compiled from the Society's records, illustrates the relative proportions of: (1) Reciprocating steam engines; (2) steam turbines; and (3) motors fitted in vessels built to class during the last four years. It also shows for the same period the proportion of the tonnage built to be propelled by the medium of (a) coal only; and (b) oil, i.e., as fuel for boilers for motors. (A proportion of these vessels can, of course, burn either coal or oil for steam raising).

	Total*	Type of Engines A	B	C	Fuel Coal	Oil
	Tons Gr.	Tons Gr.	Tons Gr.	Tons Gr.	Tons Gr.	Tons Gr.
1918-1919	3,760,806	2,633,570	1,051,302	75,934	2,491,213	1,269,593
1919-1920	4,186,882	2,821,031	1,286,046†	79,805	2,111,289	2,075,593
1920-1921	3,229,188	2,373,067	754,513†	101,608	1,260,465	1,968,723
1921-1922	2,517,513	1,420,924	870,037†	226,522	895,032	1,622,481

*Total steam and motor tonnage classed. †Al geared.
A.—Steam reciprocating. B.—Steam turbines. C—Motors.

As a matter of interest, the gross tonnage figures are given below of all the vessels of 100 tons gross and upwards, as recorded in the 1922-23 edition of Lloyd's Register Book, falling within the above categories, viz.: Total steam and motor tonnage, 61,342,952; types of engines, steam reciprocating, 51,653,324; steam turbines, 8,149,165; and motors, 1,540,463; fuel, coal only, 45,338,327; and oil (including vessels capable of burning either coal or oil), 16,004,625.

Revision Of Rules

An outstanding feature of the year has been the final adoption by the Committee of new Rules for the construction and classification of steel vessels. The last revision of the Rules of Lloyd's Register was made in 1909, prior to which date the basis of scantlings had remained practically unaltered for many years and had resulted in the recognition of numerous types of vessels, such as awning deck, shelter deck, spar deck and shade deck. The 1909 revision reduced the number of types of vessels to the full-scantling vessel and the shelter deck vessel. Experience gained since then has shown that it is possible to make freeboard assignment independent of type, and in the new Rules the principle has been recognized that, within limits, scantlings should be based upon draught.

For this purpose the revised Rules provide sets of tables for two classes of vessels, viz:—(1) The full-scantling vessel, which obtains the maximum loading permitted by the dimensions. Such vessels will be eligible for the class 100 A1. (2) The complete superstructure vessel, in which the scantlings are adjusted to a freeboard approximate to that of the present shelter-deck type with tonnage opening. These vessels will be eligible for the class 100 A1 with freeboard. Scantlings for vessels intermediate in draught between these two types can be readily derived from the two standards by proportional interpolation.

By this system the Rules are directly applicable to practically the whole range of sea-going vessels suitable for modern requirements, and it will be found that by a redistribution of material greater simplicity of construction is obtained, with a consequent saving of labor, material and weight. It is believed that these advantages have been achieved while maintaining in all respects that high standard of performance and reliability which has always been associated with the Society's classification. The Committee will continue, as heretofore, to give careful consideration to vessels intended for special trades or services, and to deal with such vessels on their merits with a view to the assignment of appropriate special classes.

Before the new Rules were finally approved by the General Committee, at a meeting specially convened for the purpose, they received the detailed con-

sideration of the Technical Committee, and also, for the first time in the history of the Society, of Representatives of the various National Committees of Lloyd's Register established in the United States, France, Sweden, Holland and Japan. The Committee therefore feel assured that the new Rules will merit, and will receive, the confidence of shipowners, shipbuilders, underwriters and merchants, as embodying the results of the best scientific knowledge and practical experience in modern ship construction. In accordance with the Standing Rules and Regulations, the new Rules will come into force in January, 1923, but they may at once be adopted, with the sanction of the owner, in the case of any vessel which has already been contracted for, or which may be contracted for, before that date. The Society's Rules for the construction of oil-carrying vessels are now in course of revision, and the new requirements will be published at the earliest possible moment.

Society's Work Abroad

In pursuance of the wishes of the Italian Government, an amalgamation was recently effected between the two Italian Classification Institutions, previously known as the Registro Navale Italiano and the Veritas Adriatico, in order to establish one Italian register of shipping, under the name of the Registro Italiano. As the outcome of negotiations conducted by Mr. Andrew Scott, the secretary, and Mr. Bernard J. Ives, assistant to the Society's chief ship surveyor, who visited Italy for the purpose, an agreement, which came into operation on April 1, 1922, has been arrived at between the new Registro Italiano and Lloyd's Register, with the object of facilitating the classification of vessels with both Societies in the interests of shipowners, shipbuilders and underwriters.

Under the terms of this agreement, Italian shipowners, while securing the national classification for their vessels, will at the same time be in a position to have Lloyd's Register class with as little inconvenience and expense as possible. With this object, the agreement provides that each institution will give every facility for the assignment of its classification to vessels classed, or intended to be classed, by the other Society, provided the standard of strength and security is not inferior to that required by its own rules, each institution reserving to itself the right of confirming the class by means of surveys by its own surveyors.

In order to obviate delays and inconvenience to shipowners and shipbuilders, the surveys of the two societies will, as far as possible, be held simultaneously, and the surveyors of both Registers are required to co-operate in entire harmony and to hold jointly the surveys which they have to carry out.

Surveys For Re-classification

As was the case in the previous year, a large number of disclassed vessels have been submitted to the requisite surveys with a view to the reinstatement of their classes in the Register Book; and many steamers not originally built under the survey of Lloyd's Register have now been submitted for the Society's classification. Among the latter may be mentioned the following and their gross tonnage:—Berengaria 52,706, Empress of Scotland 25,037, Empress of Australia 21,861, Ohio 18,000, Arabic 16,786, and Ormuz 14,588. In addition, a number of Admiralty special service vessels have been classed for the new services for which they have been altered and adapted.

During the progress of the war, and for some time afterwards, it was impossible in very many instances, in view of the lack of facilities and more particularly on account of the urgent need which existed for the continuous employment of ships, for owners to carry out at once the whole of the Society's requirements for periodical surveys, etc. and in order to meet the situation, the Committee decided early in 1917 to maintain the classification of such vessels in Lloyd's Register Book, provided that a thorough general examination—appropriate in each case to the age and condition of the ship—was carried out and all necessary repairs to ensure seaworthiness were effected. Such general examinations were to be held at intervals not exceeding six months. Later, at the request of the British and other Allied Governments, certificates were issued after survey of the Society's officers, in respect of ex-enemy vessels which had been interned or handed over, before such ships were again put into employment.

As the facilities for completing work necessary for the maintenance of class have improved, the issue of these six-monthly certificates has now been generally discontinued; but it would appear that the benefits which have accrued from sailing with such certificates have impressed the expediency of obtaining the Society's classification for their vessels upon many shipowners who had not previously been accustomed to do so.

Refrigerated Cargoes

At the end of June, 1922, the Society's certificate in respect of refrigerating machinery (Lloyd's R.M.C.) was held by 242 vessels, of which 36 were built to class with the Society during the period under review. The Society's surveyors have held 1,352 surveys during the year, at loading and discharging ports, on vessels fitted with refrigerating installations. In addition, there are at present under construction, or fitting out under the survey of the Society's surveyors, 30 vessels with refrigerating installations. Two of these vessels are being built in Australia and three in Germany. The Society's rules for refrigerating machinery and appliances have been revised and brought up to date in accordance with the latest practice.

The inauguration of a scheme of triennial surveys in connection with the Institute of London Underwriters' "Approved List" has necessitated the resurvey of a large number of frozen meat stores. The requisite inspections, together with such surveys as have been required for the inclusion of additional stores in the Approved List, have been carried out by the Society's surveyors. Over 13,000,000 cubic feet capacity of cold storage has been inspected by the Society's surveyors during the year 1921-22, an increase of over 8,000,000 cubic feet compared with the previous year. It may be recorded that, while the Approved List is limited to stores receiving frozen meat imported from overseas, the Society's surveyors are authorized by the Committee to undertake the survey, with a view to certification to Lloyd's Register, of stores which are not used for frozen meat but for goods requiring moderate temperatures.

Rules for the refrigerating machinery and appliances of frozen meat stores, based on the experience acquired by the Society during more than twenty years of close association with the cold storage industry, and embodying the essential points of the best practice, are now under consideration. A list, comprising the principal frozen meat stores in the United Kingdom, together with such stores abroad as have been surveyed and satisfactorily reported upon by the Society's surveyors, has been included in the Register Book, all stores which are on the Approved List of the Institute of London Underwriters being specially indicated.

Register Books

The circulation of Lloyd's Register Book is well maintained, the number of copies issued of the 1922-23 edition being up to the present 9,105. With a view to reducing the bulk of the steamer volume of the posted Register Book, the particulars relating to trawlers, drifters, and other fishing vessels, have been transferred to the sail volume, and now constitute a separate section therein. It is hoped that this modification will prove of convenience to users of the Register Book in this form.

The Society's British and American Yacht Registers both continue to command a good circulation, although yachting is only slowly recovering from the severe check imposed upon it by the war. A number of yachts, especially of the six-metre class, have been built under the new rules which were issued last year, for yachts of the international rating classes. Widespread interest has been occasioned by the series of races between six-metre yachts belonging to the United States and this country, all of which have been built to the Society's classification.

The Shipping Conferences

In the autumn of 1921, an International Shipping Conference was held in London under the joint auspices of the Chamber of Shipping of the United Kingdom and the Liverpool Steamship Owners' Association.

Among the several sub-committees appointed by the conference may be specially mentioned those dealing respectively with the carriage of deck cargoes of wood goods, load line of cargo vessels, sub-division of passenger vessels, and life-saving appliances and wireless telegraphy.

The sub-committee on deck cargoes met at Christiania in January, and the three other sub-committees in London in May, 1922. At the request of Sir Frederick W. Lewis, Bart. (last year's vice-president and this year president of the Chamber of Shipping of the United Kingdom) and with the consent of the General Committee, the Society's chief ship surveyor, Sir Westcott S. Abell, K.B.E., assisted all these Committees, and the services of other members of the Society's staff were also lent.

It has afforded the Committee of Lloyd's Register great gratification to receive from Sir Frederick Lewis, as president of the Chamber of Shipping, letters acknowledging in very cordial terms, on behalf of British shipowners, their peculiar indebtedness to the Society for the assistance rendered. In this connection, it may be observed that the necessity for international understanding in maritime matters has, in the last few years, become more and more appreciated by all members of the shipping industry, and there is no doubt that this tendency has been fostered by the work and organization of Lloyd's Register through its committees in this and other countries.

Rules For Water-tube Boilers

In April, 1922, the Society received an invitation from the Mercantile Marine Department of the Board of Trade, suggesting the desirability of a conference between representatives of the department and the Classification Registries in reference to the adoption of Rules for the construction of water-tube boilers, which had been drawn up and recommended by the British Marine Engineering Design and Construction Committee of Naval Architects. The General Committee of this Society concurred in the proposal, and nominated Mr. James Brown, C.B.E., and Mr. Andrew Laing, C.B.E. (members of the Committee), together with Dr. J. T. Milton, the Society's consultant engineer, and Mr. H. Ruck-Kene, the Society's chief engineer surveyor, to represent Lloyd's Register at the Conference. It is expected that the report of the conference will shortly be available.

During the year 1921-22 freeboards were assigned to 651 vessels, which brings the total number of assignments by the Committee of Lloyd's Register under the Merchant Shipping Act, 1894, up to 22,916.

Japan Ship Load Line Law

Under the Ship Load Line Law of Japan, which came into operation in February last, all Japanese ships are required to have freeboards assigned in accordance with the National Freeboard Regulations. These regulations are based upon those in force in this country, and have been accepted by the British Board of Trade.

Lloyd's Register has been authorized by the Imperial Government of Japan to assign load lines and to issue freeboard certificates to Japanese vessels under the provisions of the Ship Load Line Law, and arrangements have been made for these assignments and certificates to be issued from the Society's Kobe office under the direction of the Japan Committee. It should be added that freeboard certificates issued by British assigning authorities to vessels other than those sailing under the Japanese flag are recognized in Japanese ports.

Testing Operations

The total length of chain cable tested under the Anchors and Chain Cables Act, 1899, during the year 1921-22, at the public proving houses in the United Kingdom, all of which are under the superintendence of the Society, was 168,572 fathoms, in addition to a quantity of miscellaneous chains and samples. The number of anchors tested was 3 095. Ship and boiler steel tested by the Society's surveyors at home and abroad during the year ended June 30, 1922, amounted to 308,642 tons only, as compared with 1,451,311 tons tested during the preceding twelve months. This enormous reduction of 79 per cent. is again significant of the state of the shipbuilding industry.

Lloyd's Register Scholarships

Since the issue of the last report, the Committee have instituted scholarships in naval architecture and marine engineering at the University of Michigan and at the Massachusetts School of Technology, Boston (Mass). This addition brings the number of scholarships in naval architecture and marine engineering maintained by the Committee of Lloyd's Register to twenty-three. Several of these are specially assigned to the Universities of Glasgow, Durham, Liverpool and Tokio; while three are awarded through the Institute of Marine Engineers, and may be held at any approved university or other centre of advanced technical education. All are tenable for three years, and applications for particulars concerning them should be addressed to the registrars or secretaries of the various universities, etc.

The Committee desire to take advantage of this opportunity to direct attention to these scholarships, which though in abeyance during the war, have again been available since 1919. They hope that more wide-spread knowledge of the means which the scholarships provide for students of naval architecture and marine engineering to add to their proficiency will lead to keener competition for their possession than has been evinced in some cases in recent years.

Concluding, the report refers to the unveiling in May last by Lord Methuen of the mural tablet erected in the Society's head office in memory of members of the staff who fell during the war. Reference is also made to recent staff appointments and retirements, and to the retirement of Sir John Luscombe from the chairmanship.

BRITISH PORTS

His Majesty's Trade Commissioner at Toronto has supplied us with the following further information on the facilities afforded by British ports. This information, which we have published from time to time as the Commissioner has made it available, should be of use to those who may have shipments to make in different districts in the United Kindom.

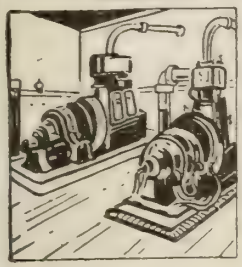
The Tyne Ports

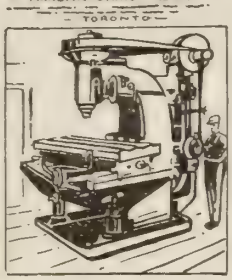
The Tyne Ports consist of Newcastle-on-Tyne and the towns of Gateshead, Jarrow, and North and South Shields. The River Tyne is under the jurisdiction of the Tyne Improvement Commissioners, whose control extends from the seaward end of the two piers at the mouth of the river to Hedwin Streams, a distance of about 19¼ miles with a total area of about 2,250 acres. These ports are of first importance for the export of coal and for such industries as shipbuilding, ship repairing, iron and steel manufacturers, timber yards, saw mills, lead and brick works, chemical manufactures, and paint and color works.

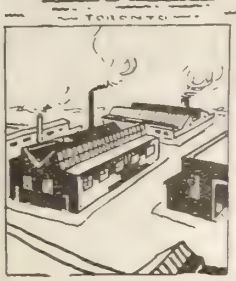
Among the important shipyards which line the banks of the Tyne are those of such famous companies as Sir W. G. Armstrong Whitworth and Co., of Walker and Elswick; Swan Hunter and Wigham Richardson, Ltd., of Walker and Wallsend; Palmers Shipbuilding and Iron Co., Ltd., of Hebburn and Jarrow; R. and W. Hawthorn Leslie and Co., Ltd., of St. Peters Works, and Hebburn; and Smith's Dock Co., Ltd., of South Shields, and some of the largest vessels in the British and foreign mercantile marine have been constructed in this district. The Tyne shipyards have also constructed many famous men-of-war for the Royal Navy, and vessels for specially arduous work such as the icebreakers "Ermak," "Sviatogor" and "Alexander."

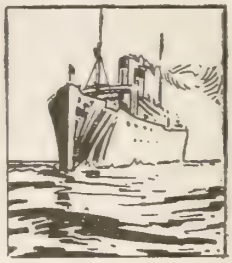
The Tyne is connected by regular steamship services with Scandinavia and the Baltic, North America, Continental and Mediterranean ports. There are also many coastwise services to the principal East Coast ports of Great Britain, and to Liverpool and South Wales.

The entrance to the river is protected by two stone piers about 2,950 and 5,150 feet long respectively, with an opening between the two pier heads of about 1,200 feet. The channel from the









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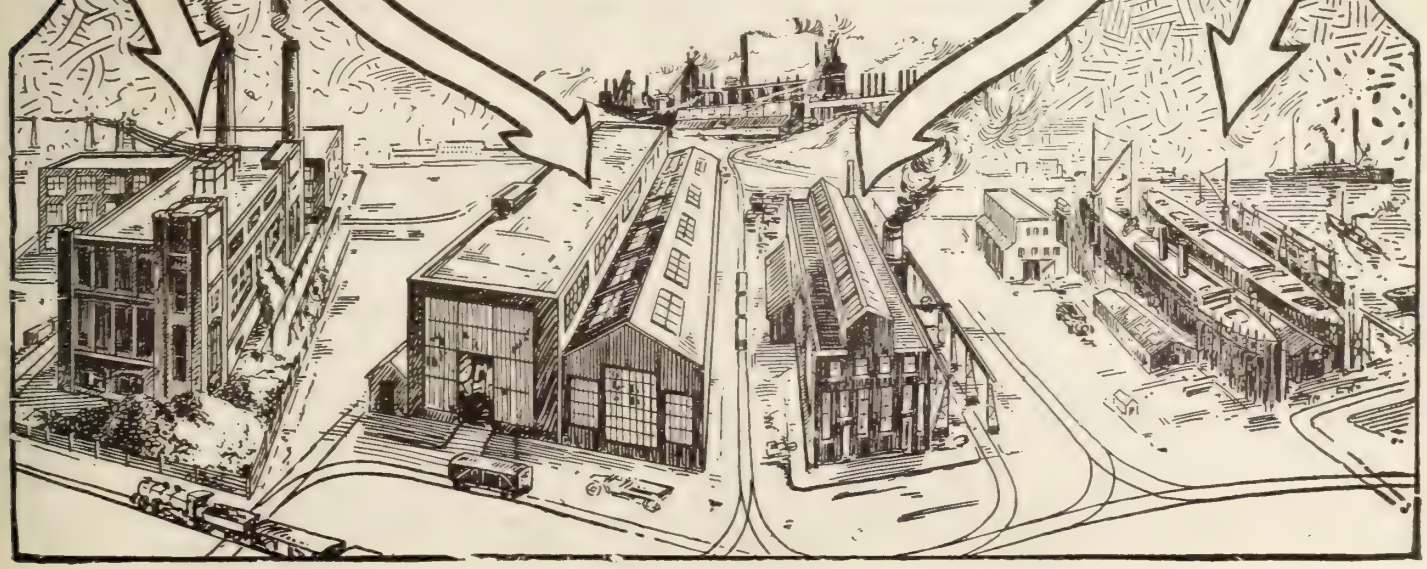

sea to Northumberland Dock, a distance of about one and a quarter miles, is dredged to a depth of about 30 feet L. W. O. S. T., and for a distance of about 11 miles westward from Northumberland Dock to a depth of about 25 feet L. W. O. S. T.

In the River Tyne, H. W. O. S. T. is about 15 feet above L. W. O. S. T., and H. W. O. N. T. is about 11 feet above L. W. O. S. T., while L. W. O. N. T. is about 3 feet above L. W. O. S. T.

The dock accommodation on the north side of the river is the property of the Tyne Improvement Commission, and consists of:—

The Albert Edward Dock, which has an area of about 22½ acres and is 1,300 feet in length and 900 feet in width, with a total quayage of 3,000 feet. The length of the entrance lock is 345 feet and its breadth is 60 feet at the top and 53 feet at the bottom. The depth over the inner sill of the lock is about 30 feet H. W. O. S. T. The Tidal Basin has an area of 2¾ acres, and there are about 900 feet of quayage facing the river. The dock is equipped with nineteen hydraulic and steam cranes capable of lifting from 1½ to 10 tons; one crane capable of lifting 23 tons, and, on the river wall, one crane to lift 3 tons. There is also a coal staith with two berths equipped with band conveyors and capable of shipping 500 to 700 tons per hour at each spout, and a warehouse for grain or general merchandise 200 feet long by 100 feet broad, capable of storing 40,000 quarters of grain and containing six floors fitted with hydraulic machinery, while spacious cellars are provided for the storage of provisions, tallow, and other goods.

Northumberland Dock, which is situated about 1,200 yards southwest of the Albert Edward Dock entrance, is 3,700 feet in length and 650 feet in width and is used for general import and export traffic and is equipped with large warehouses and 4 steam cranes to lift from 1½ to 3 tons. It has a water area of about 50 acres, and the entrance lock, from a tidal basin 480 feet in length, 170 feet in width, and 2¼ acres in extent has a length of 245 feet and width of 52 feet at the top and 47 feet at the bottom, with a depth of water on the centre of the sills of about 24 feet at H. W. O. S. T. At this dock there are four staithes, providing seven berths, belonging to the North Eastern Railway Company, and six staithes belonging to private colliery companies, and capable of loading up to 500 tons per spout per hour.

Tyne Dock on the south side of the river is owned by the North Eastern Railway Co., and has a water area of 50 acres and a tidal basin of 10 acres. The entrance lock is 80 feet wide with a depth of 33 feet H. W. O. S. T. The dock is equipped with four coal shipping staithes, providing 10 berths carrying 42 spouts, and 41 steam, hydraulic, and electric cranes, capable of lifting from 1½ to 30 tons. There are 14 large warehouses and sheds for the storage of grain and general cargoes, while there is open space, 215 acres in extent, available for storing timber. There is also a timber pond 35 acres in extent belonging to the North Eastern Railway Company.

Adjoining this dock is a timber pond known as Jarrow Slake, 76 acres in extent, belonging to the Tyne Improvement Commission.

Newcastle Quay (owned by the Newcastle Corporation) on the north bank of the Tyne extends 4,770 feet eastward of the Swing Bridge at Newcastle-on-Tyne, and has an average depth alongside of 25 feet 9 inches at high water. A warehouse capable of holding 120,000 quarters of wheat has been constructed here by the Newcastle Grain Warehouse Company. The regular Norwegian and Swedish passenger steamers berth at this quay.

Gateshead Quay (owned by the Gateshead Corporation) extends 750 feet eastward from the Swing Bridge on the south side of the river, has a depth of 33 feet alongside at high water, and is equipped with cranes to lift up three tons.

The St. Lawrence Cattle Wharf, owned by the Newcastle Corporation, has a length of 390 feet and an average depth of 35 feet alongside at high water.

There are wharves at North Shields belonging to the Tynemouth Corporation. There are also numerous staithes which are privately owned, and two staithes providing six berths at Dunstan, belonging to the North Eastern Railway Company. At this site one staith with three berths, with two spouts each, is in the River Tyne, and the second staith providing similar accommodation is in a tidal basin 7¼ acres in extent, 1,350 feet long by 330 feet wide, with a width at entrance of 80 feet. The depth of water at the river staith is 40 feet H. W. O. S. T., and at the entrance to the tidal basin 36 feet H. W. O. S. T. Vessels at these staithes can be loaded at 600 to 800 tons per hour.

Whitehill Point Coal Staithes, between the Albert Edward and Northumberland Docks, are the property of the Tyne Improvement Commissioners, have a depth of water of 33 feet H. W. O. S. T., and are equipped with endless coal band conveyors and fitted with hydraulic lifts for loading and bunkering steamers of exceptional height. Five large vessels can be accommodated at this berth, and coal can be shipped at from 500 to 700 tons per spout per hour.

North Shields is the headquarters of an extensive fish trade and has a good quay frontage of about 1,600 feet, equipped with sheds and warehouses, and steam cranes.

There are numerous dry docks on the Tyne, all of which are privately owned and many of which are capable of accommodating the largest vessels. The numerous docks, quays, and staithes are all connected with the North Eastern Railway, the Tyne Commissioners alone owning 45 miles of railway line, and landing and discharging can be carried on direct from truck to ship, or ship to truck. Fast goods trains connect Newcastle-on-Tyne with all the principal manufacturing centres of the country, and frequent connecting trains are run from all stations on the north and south sides of the River Tyne.

The Tyne being the main outlet for the Northumberland and Durham coalfields, with an annual shipment of nearly 20 million tons of coal in normal years, is an excellent bunkering port, and vessels calling for the purpose of taking bunkers obtain the benefit of modified dues.

There are also facilities for discharging petroleum oil, and similar cargoes at a special quay at South Shields, equipped with tanks and all possible facilities.

Additional facilities for the discharge and bunkering of oil fuel are being provided by the construction of a deepwater river berth at Jarrow Slake, 600 feet in length, with a depth of 30 feet L. W. O. S. T. This berth is being provided for the Shell-Mex, Ltd., and the British Petroleum Co., Ltd., for whom oil fuel installations are in course of construction at Jarrow, and is being so arranged that an additional berth can be provided when necessary. This work is now practically completed, and it has already been possible to discharge four vessels of a tonnage up to 9,000 tons, and arrangements can be made to supply oil bunkers.

Among other improvements the North Eastern Railway are constructing a riverside quay at Tyne Dock. Newcastle Quay is also being extended in an easterly direction, and will thus provide additional berths for vessels loading and discharging general cargo.

Cardiff is the natural geographical port of shipment for the South Wales coalfields, and the fact that it is to-day one of the first ports in the world for the export of coal is largely due to the favorable position occupied. The railway rates for the carriage of coal from the pit's mouth to the docks are less than those of most other ports. Tipping is continued day and night, there being no extra charge for night work.

There is an extensive trade in iron ore, steel bars, pit wood, timber, and grain at the port of Cardiff. During recent years there has been a substantial increase in grain, flour, potatoes, provisions, frozen meat, and general merchandise. Extensive warehouse accommodation is provided. In all there are 20 warehouses on the docks, and, where it has been found necessary, overhead travelling gantries have been installed to facilitate the handling of goods. In substantiation of Cardiff's claim to become a food import centre, it is interesting to note that within a 30 miles radius the population exceeds two millions, while within 90 miles radius the population is not less than ten millions. The importance and suitability of Cardiff for imported foodstuffs has not yet been fully appreciated, the reason for this being that in pre-war days the port's activities centred in the export of coal, so that very little attention was paid

(Continued on page 23)

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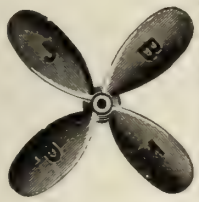

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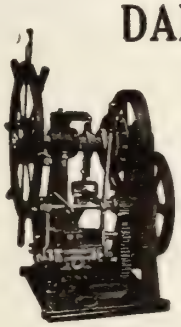

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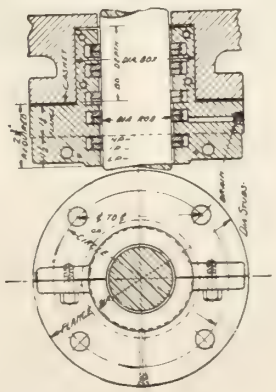

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MARINE NEWS FROM EVERY SOURCE

Fort William:—Great activity is evident in the grain carrying trade, and it looks as though the last month of the season will be a heavy one. In the week ending Nov. 14th, fourteen grain carriers sailed with cargoes aggregating 4,000,000 bushels of grain, and there was no cargo less than 100,000 bushels. The "W. Grant Morden" took a cargo of an even half million bushels.

* * * *

Buffalo:—Owing to the slow handling of the vessels at this port, some of the carriers will only make one trip this month, and the delay is going to make it difficult for some of the vessels booked for storage to get their cargoes. Some of the vessels have been waiting two weeks in the port, and a number of the managers have taken a trip to Buffalo to see what they can do about getting their vessels away.

* * * *

London:—It is stated that during the coming winter a newly formed company will build eight ships of 5,000 tons each, fitted with insulated holds and refrigerating machinery for the Australian meat trade. The company's plan is to ship the meat from the west coast to Australia instead of the East as at present, and thus considerably shorten the voyage back to England. The meat will be chilled and not frozen.

* * * *

Goderich:—This port has been the scene of long investigations by Government engineers looking to the development of the harbor, and the provision of further grain elevating equipment. The harbor work is to include dredging the harbor to a depth of twenty-five feet. and the joining of the break water to the outside break water. Goderich expects some day to be the leading grain port of the Lakes.

* * * *

New York:—In order to escape the drastic prohibition regulations now being put in force by the U. S. government, two large liners, the "Reliance" and "Resolute" have been transferred from U. S. registry to that of Panama. These vessels are the third and fourth largest vessels now in operation under the American flag, the Resolute being 20,200 tons and the Reliance 19,800 tons. They belong to the United American Lines.

Quebec:—News of a motor boat tragedy involving the fate of eleven persons, has been received here from Bersimis, on the north shore of the St. Lawrence. The accident occurred in the Lake of Smelter, Bay River, which is about thirty miles up from the coast, the launch being sunk, and all the passengers drowned. Owing to the difficulties of communication on the North shore, no word has yet been received as to the details.

* * * *

Sydney:—The fact that two boats instead of one as has been the case all summer, are now employed in the carrying of ore from Wabana to Sydney, would seem to indicate fresh activity in the steel mill here. There are large supplies of ore on hand in addition to those being brought in by the boats. The "Wascana" which has been in the Rotterdam Wabana service all summer has just been transferred to the Wabana, Sydney route to assist the "Daghild."

* * * *

San Francisco:—The conference on Pacific westbound freight rates closed with representatives of ten Trans-Pacific companies as signatories to the agreement. The rates were those agreed on at a preliminary conference held in Portland in May last. The Canadian Government Merchant Marine and three Japanese lines did not sign the agreement, but will operate independently. The conference will be reopened in Vancouver, B. C., in January next, when the posting of a bond for $25,000 by each of the companies will be decided upon.

* * * *

Montreal:—Officials of the port of Montreal refer to the month of October as one of the busiest in the history of the port. The total amount of grain handled up to October 31 by the harbor and Grand Trunk elevators was 134,593,555 bushels as compared with 127,498,088 for the same period in 1921. The business up to the end of October brought the figures to within 4,000,000 bushels of the entire 1921 business, and over two hundred more grain vessels were expected to arrive before the end of the season. The ship tonnage figures up to the end of October were 1055 ocean ships of 3,455,902 tons as compared with 871 ships of 2,606,874 tons last year in the corresponding period.

Montreal:—The C. G. M. M. will maintain eight distinct lines with twenty-two vessels according to a schedule issued to local shippers. Thirteen ships will make St. John, N. B., their winter headquarters and the remainder will use the port of Halifax. The British services will run out of St. John, while the coasting service, the West Indian service, and the Australian service will run out of Halifax.

* * * *

Milwaukee, Wis.: — The package freighter "Nordland" caught in a heavy storm on Lake Michigan, sprang a leak and sank about eight miles from St. Frances. The officers and crew, who numbered nineteen, took to the boats fifteen minutes before the vessel sank, and in spite of the heavy sea succeeded in making shore in safety. The "Nordland" was a wooden vessel, thirty-three years old, and having a capacity of 700 tons. Her cargo was valued at $500,000 and is a total loss.

* * * *

Montreal:—The Canadian Pacific Steamship steamer "Monteagle" recently arrived in this port with no passengers, but with a cargo of 1,250,000 feet of lumber, consigned to Montreal Harbor Commissioners, brought from British Columbia via the Panama Canal. This is the first contingent of an order of 5,000,000 feet for lengthening the liner piers in the harbor. The "Monteagle" is now definitely out of the passenger trade, she having been replaced by the "Empress of Canada." The "Monteagle" is a vessel of 6,163 tons, while the "Empress of Canada" is a 22,000 ton ship.

* * * *

Owen Sound:—John Tackaberry of Lion's Head has purchased the steamer "Bon Ami," and will run her in conjunction with the steamer "Henry Pedwell." The "Bon Ami" was built in Manitowoc, Wisconsin, in 1902, and is of 142 registered tons. She is 105 feet long, 24½ feet beam, and has a gross tonnage of 245 tons. She has accommodation for 20 passengers in her staterooms, and is licensed to carry a total of 250 passengers. She is a screw boat of 28 horse power nominal. She was formerly owned by T. C. and C. L. D. Sims of Little Current, and was formerly called the "Mariposa."

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Fredericton:—The following figures for the month of October show a decided increase over the corresponding month last year. The total port receipts for the month were $87,929, as against $34,476 last year in the same month. The import duties were $14,000 in excess this year over last.

* * * *

Port Arthur:—A recent cargo of the "Grant Morden" consisted of 450,000 bushels of wheat and 50,000 bushels of barley, one of the largest cargoes ever carried on the Great Lakes. The freight on this cargo ran into the sum of $35,000. During the season the "Grant Morden" has made several trips on which her freight earnings were between $20,000 and $30,000.

* * * *

Melbourne, Aus.:—The crew of the P. and O. steamer "Orvieto" recently went on strike in the port of Melbourne leaving the vessel at anchor in Hobson's Bay, demanding that their pay be increased to the Australian coastal rate. Warrants have been issued for the whole crew amounting to 350 men. Recently twenty-seven members of the crew of the "Paloona" who went on strike and prevented the vessel sailing for New Zealand, were sentenced to a fortnight's imprisonment, and thirty of the crew of the steamer "Waikawa" have been similarly treated.

Cleveland — The Morrow Steamship Co. has sold the barge "George E. Hartnell" to the Midland Shipbuilding Co., and it is understood that the latter company will convert the barge into a steamer. After the alterations she will sail under the management of James Playfair. She was built in 1896 and she will have a capacity of about 5,000 tons after alterations.

* * * *

Halifax:—A large quantity of Canadian grain will be shipped this winter from Portland, Maine, being brought to that port over the lines of the Canadian National and Grand Trunk Railways. It is understood that several million bushels have already been routed that way. Considerable dissatisfaction is expressed by Maritime and Quebec shipping men that more use is not being made of the St. Lawrence route while it is still open, instead of the American port being most favored.

BRITISH PORTS

(Continued from page 20)

to the advantages offered for receiving food cargoes.

Sunderland

The port of Sunderland, situated at the mouth of the River Wear, is the chief seaport between Hull and Newcastle-on-Tyne, has a population of over 160,000, and serves a populous district of two million inhabitants. It is of great importance as an outlet for several of the most important Durham collieries, and the normal annual shipments of coal amount to about four million tons, while quantities of coke and smithy coals are also exported.

The Conservators of the port are the River Wear Commissioners, whose jurisdiction extends from the harbour entrance to Biddick Ford, a distance of 9 miles. The Commissioners also own the extensive docks on the south side of the river.

The harbour is approached between two piers constructed of concrete faced with Aberdeen granite, while, normally, vessels can also enter the port by means of a sea lock at the South Outlet, protected by two piers and wave screens. At the present time a depth of about 20 feet at L.W.O.S.T. has been attained in the channel, and ships of 7,000 tons deadweight are able to use the river as far as the Hetton coal shipping berths above Wearmouth Bridge, a distance of two miles from the sea, while the docks can accommodate even larger vessels. As spring tides in the River Wear rise 14½ feet, the depth of water available at H.W.O.S.T. is 34½ feet, or 31 feet at H.W.O.N.T. and 25 feet at L.W.O.N.T.

(To be continued.)

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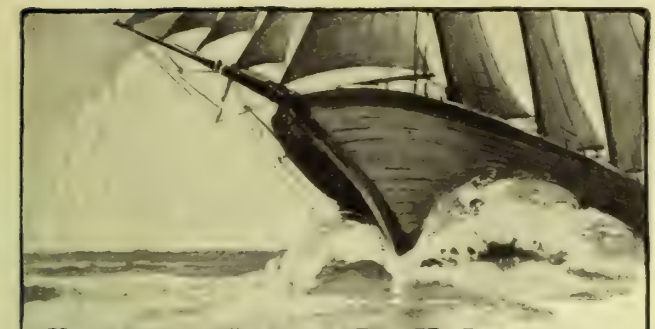

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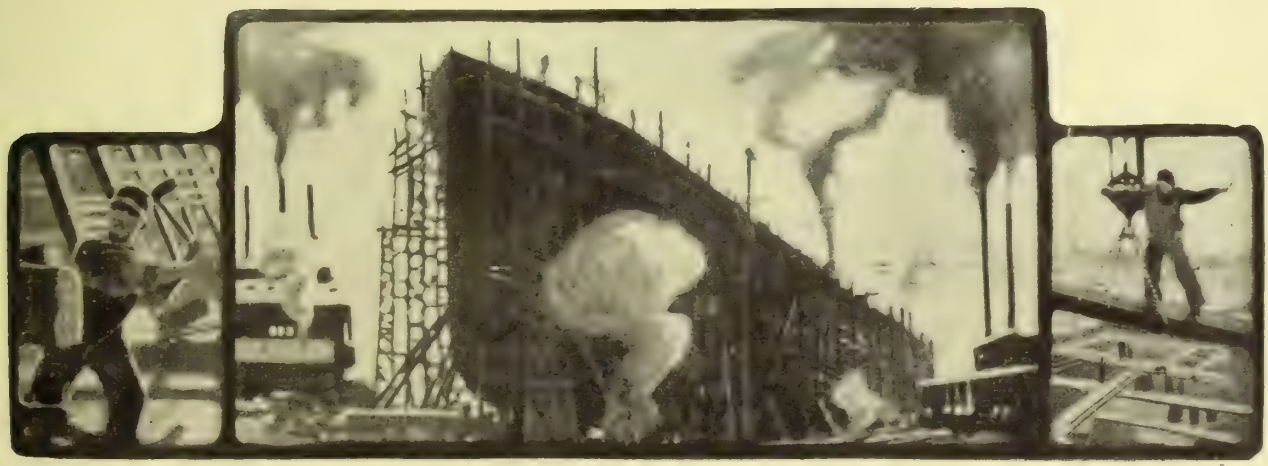

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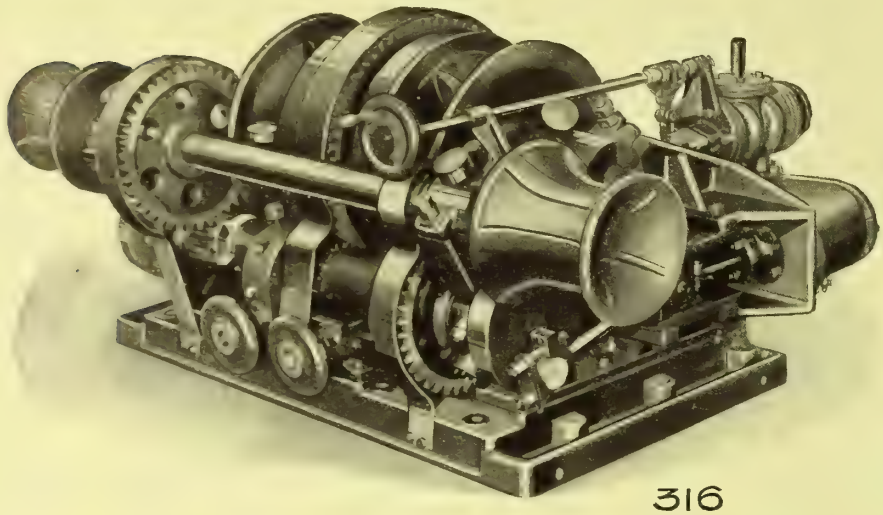

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Current News of The Ancient Colony

Special to "Canadian Shipping"

AT THE time of the compilation of our last month's notes under this head, the Canadian Government Merchant Marine steamer "Canadian Seigneur" was drifting about in the North Atlantic, in a disabled condition, some seven hundred miles to the north-east of the port of St. John's, with the Reid Newfoundland Company's steamer "Meigle" standing by. Since then the Seigneur has been brought safely to port, and the story of the voyage can now be told in detail.

"Meigle" Abandons Tow

On the evening of November 19th, S. S. Meigle, Captain Cross, returned to port, after having made a gallant attempt to tow the disabled Seigneur to anchorage. The Meigle had left St. John's some fifteen days previously with an ample supply of bunker coal and all the accessories necessary for the long tow which was contemplated. On clearing the harbor, course was shaped north-east, and the ship steamed 800 miles toward the position from which the Seigneur was reported. Fine weather was experienced and Meigle reached the disabled ship on the evening of November 7th. Owing to darkness nothing was done until daylight next morning, when after considerable manoeuvring a line was placed on board the Seigneur, and the long tow started. Good progress was made during the day, but at 9 o'clock that evening the wind came out of the west, and blew strongly, kicking up a heavy sea, the run of which so strained the hawsers that they parted from the shackles, and tore away the after bitts of the towing ship. On Thursday, 9th, another try was made, the tow lines having been re-shackled and made fast, but the wind continuing strong and sea high, very little forward movement was made, the towed ship, being rudderless, yawing about in all directions.

Steered from Astern

When weather moderated and sea went down, a new plan was adopted. As the Seigneur was able to use her own engines, the masters of both ships decided that it would expedite matters if Meigle were to take up a position astern and act as rudder. This was done and found to work very advantageously, but at noon a heavy nor'wester blew up, making a high sea, and in consequence the ships had to swing apart, the lines being let go. Next day it still continued blowing heavily, consequently nothing was done, both ships having all they could do to keep in sight of each other. The next day, and the day following, similar conditions prevailed, and both ships were wallowing in the trough of the sea but maintaining sight distance. On the Monday following the towing hawsers were once more passed, Meigle still keeping her position astern. Little however, was accomplished as the wind again breezed up, necessitating slipping the hawsers. On Tuesday morning these were again made fast and some steady progress was made until shortly after 8 bells (noon) operations had to be suspended and the cables were cast off. Nothing was done on the 15th. Weather was hazy with continuous rain, both ships often being out of sight of each other. On Friday, 17th, the smoke of a steamer was seen, and finally the hull was made out, the direction being toward the position of Seigneur and Meigle. The latter ship at once began to steam toward the oncoming vessel, but before coming within hailing distance, received a wireless ordering her back to port, not before, however, identifying the other ship as the "Canadian Sapper," ordered from St. John to assist Meigle, or to take up the tow herself. As the aid of Meigle was now unnecessary, that ship bore up for port, having accomplished the task, under exceedingly difficult conditions, of towing the Seigneur 380 miles. The position of the disabled vessel was then approximately 340 miles north-east of Cape Spear.

Remarkable Feat of Seamanship

S. S. "Canadian Sapper," Captain Blouin, came alongside the Seigneur shortly after Meigle had straightened up for home, but for the first two days subsequent to her arrival nothing could be done. At length hawsers were passed and the strenuous tow began. It was a most trying one, as time and again the cables would part, and it required the most skilful seamanship to keep the Sapper close enough to the stern of Seigneur to do effective steering, and this was accomplished only at great risk. The weather continued rough throughout the whole tow and gales blew from all points of the compass. The tow lines were constantly parting, and it was only by sheer will power and stick-atitiveness that they were made fast as often as they snapped. On one occasion it became necessary for the safety of both ships to cut the towing cables. On another the ships became separated for some hours, but eventually came together again, when new lines were passed and the tow resumed. On Tuesday morning, November 21st, the vessels were 28 miles from St. John's, and looked forward to making port that evening or next morning. At daylight a southwest gale sprung up, and no progress was made, both ships keeping head to wind only, heaving to when night came down. At 11 o'clock that night weather cleared and Cape Spear light became visible. The ships continued hove to, about twelve miles off, until morning. At daybreak the course was taken up, and on Friday morning, Nov. 25th, they cast anchor in Freshwater Bay, and signalled for tugs. Three responded, and with the Sapper steering and the tugs made fast alongside, the Seigneur was guided through the Narrows and dropped anchor in the harbor, after, perhaps, one of the most trying voyages on record. The towing and steering by both Meigle and Sapper were feats of seamanship not often equalled, and it speaks highly of the training of Captains Cross and Blouin that their salvage should have had such a happy termination.

Story of the Voyage

S. S. "Canadian Seigneur" left Liverpool, England, on the 25th of October for Montreal, her cargo consisting of

4,000 tons coal and 1,000 tons pig iron. Six days after leaving port heavy gales with high seas were encountered, and hurricanes continued day after day, the seas sweeping over decks and superstructures, rendering it unsafe for the crew to get about during watches. Time and again the fore and aft wells became seething cauldrons of ocean brine, and no man could get about his work, excepting those on the upper deck and bridge, and even their case was most precarious. The ship made very bad weather with such a dead weight cargo, and when a tremendous crash of sea carried away the rudder and part of the stern frame, a most desperate situation arose. The position then was approximately 740 miles northeast of Cape St. Francis. Following loss of rudder the engines were stopped and the ship allowed to drift. An S.O.S. call was sent out. In the meantime all hands turned to in the height of the storm and improvised a jury rudder, but it could not be rigged owing to the high sea running. For two days and nights every attempt was made to get the makeshift overboard but this was not possible, notwithstanding superhuman efforts on the part of captain, officers and crew. Word of Meigle's coming having been received, Seigneur was hove to, but the drift had been away from the position as at first reported. Wireless messages were exchanged and positions given as near as possible, so that Meigle had not much difficulty in picking up her quarry. The story of the tow has been told above. Captain Potts of the Seigneur speaks highly of the work accomplished by Meigle, and has nothing but good words for Captain Cross and his crew for their great and valuable assistance rendered under the most trying conditions. The Seigneur is now in dry dock for the purpose of having a new stern frame put in position and rudder hung. She will be ready to proceed ere this is in print. It is a most peculiar thing, but the Seigneur seemed to be followed by bad luck, or a hoodoo, on the present voyage. Just before leaving Liverpool the chief cook was suddenly taken ill and died. Another of the crew deserted and a young Canadian desirous of getting back to the West quickly, was signed on in place of the absentee. Three stowaways were discovered after clearing the Mersey. These have been dealt with by the police authorities here, and will be deported.

"Canadian Gunner" on Fire

S. S. "Canadian Gunner" arrived in the port of St. John's on Friday, December 1st, with general cargo from Montreal. Work of discharging was proceeded with immediately. On Saturday evening, December 2, it was suddenly discovered that the ship was on fire. She had hauled to the dry dock to land a stern frame for S. S. "Canadian Seigneur" when smoke was observed issuing from No. 2 hold, bunker covers and ventilators. The fire department of the city was notified and immediately responded, the Inspector General of police and firemen being in charge. While waiting, a steam hose was projected into the fire area and kept working until the arrival of the firemen, who immediately connected up their hose and sent streams of water into the seat of the conflagration. After working two hours, without any apparent effect, it was decided to remove the ship from the dock premises and tow her to the pier of the agents, Furness Withy Company. This was done, and at once a crowd of laborers were put on to discharge cargo, while two heavy streams of water were kept pouring into the holds where the fire had originated. Afterwards it was discovered that the source of the blaze was in a cross bunker, containing some 60 tons of coal and a quantity of baled hay. It is now believed that spontaneous combustion of the latter was responsible for the outbreak.

Worked Like Trojans

All hands employed were by this time working like Trojans in a supreme effort to conquer the flames, which were arising from all quarters. The longshoremen worked in relays removing the burning cargo, the work proceeding without interruption, although exceedingly difficult owing to smoke and steam. Some of the burning bales of hay were dumped overside into the waters of the harbor, whilst a large quantity damaged only by water was landed and piled in the company's yard. The firemen had a very difficult task, as it was the desire of the steamship agents that the holds should not be flooded, fearing injury to portions of the cargo not within the fire area. Inspector General Hutchinson personally directed this part of the work, and it is due to his supervision that but little damage was done to cargo in the holds not affected by the fire. Notwithstanding all the efforts of the firemen the seat of the blaze had not been located up to Monday, December 4th, though the intrepid men of the department had carried their lengths of hose throughout the 'tween decks and in the lower holds, directing streams of water wherever any sign of the fire showed. A hole was cut through the main deck with an acetylene burner and through this orifice another nozzle was intruded, playing a stream on the cargo steeved in the hold directly underneath. At this time the Gunner had about 17 feet of water, by sounding, and took a heavy list to port. At length, however, the continuous exertions of the firemen and laborers had effect, and at 9 o'clock on Monday night, Dec. 4th, the fire was gotten under control, and all further danger passed. Captain Seaman of the Gunner spoke very highly of the splendid work of the firemen and longshoremen, and said that St. John's possessed the most competent fire department that he has known in any port. The damage done to ship and cargo is estimated to be in the vicinity of $100,000. A survey was subsequently held, the report of which has not yet been made public. The cargo of the ship comprised flour, hay, bran and oats, all destined for St. John's consignees. Some of the damaged stuff has already been disposed of by public auction.

Of General Interest

S. S. "Bethlehem" reported in November "Canadian Shipping" as having been towed into Port aux Basques by S. S. "Kyle" on Oct. 30th, effected temporary repairs at that port and eventually continued the voyage to Bell Island, Conception Bay, where she landed her coal cargo, ultimately coming to St. John's on November 28th, and going in dock to have a new rudder placed in position. This ship, we understand, has been libelled by the owners of S. S. "Kyle" for $30,000 as a salvage claim, but bonds for the sum of $15,000 have been given by the Atlantic Chartering Company, owners of the ship, and she has been released, pending settlement between principals.

The ledges of Flower's Cove, Straits of Belle Isle, picked up another steamer on Thursday, November 23rd, this time S. S. "Nordfjeld" being the victim. The ship, at the time of the casualty, was bound from Sunderland to Quebec with a cargo of coal. She has been surveyed and condemned as a total loss. The captain and crew were brought to Bay of Islands by S. S. "Sagona," a few days ago, from whence they will be sent to Norway, via Halifax. The ship belonged to the Garras Line of Christiania, Norway, and was built by Messrs. Swan and Hunter. Her dimensions were:—Gross tonnage, 3,631; nett, 2,307; length, 347.5 ft.; breadth, 45.3 ft.; depth, 26 ft. Built at Newcastle in 1900.

The Danish steamer "Olaf L. Kongstead" from Chicoutimi, Quebec, arrived in the port of St. John's on November 29th, short of bunker supplies. Having received these she sailed for a port in England without any delay. Her owners are T. Neilson & Co. of Copenhagen. The "Kongstead" is a ship of 2,827 tons, gross, 1,826, nett register.

H. M. S. Raleigh Abandoned to Wreckers

Captain Hearn of the Canadian Government steamship "Montcalm," which recently returned to Charlottetown, Prince Edward Island, from the Straits of Belle Isle, reports that the wrecked British cruiser "Raleigh" is still in the same position on the reef of L'anse Amour, quite near the beach, and it is possible to walk aboard at low tide. Newfoundland fishermen and others are busy dismantling the wreck of everything they can take away. Soon only the big guns will remain. There is evidently no intention on the part of the Admiralty to refloat the cruiser, and she has been abandoned. Some of the "wreckers" are camping in the near

vicinity in order to beat out other competitors in the free for all game of everything that can be lifted.

THRILLING TALE OF THE SEA

S. S. Craigness Reaches Port

S. S. Craigness, bound from Middlesborough, England, to New York, with some 5,500 tons pig iron and several hundred tons general cargo, was towed to port on Sunday, Dec. 10th, in a badly battered condition. The Craigness left the other side 14 days ago. Fairly moderate weather was met during the first six days out, but since that time both Captain Stellar and his crew have been battling for their lives against the elements. A week ago the trouble began, when an exceptionally heavy sea boarded the ship aft, and when she came through it was found that the steering gear was completely out of order. The ship was steered by what is known as the Telomotor system. This was all smashed in various sections and the big steamer was left at the mercy of the weather, which at that particular time was very boisterous. Capt. Stellar was not daunted, however, and immediately set about to rig up the hand steering gear. Wire hawsers attached to the winches were got into position and by this means the ship was worked to land. Time and again, however, these broke, causing much uneasiness and trouble. The weather was terrific, and Captain Stellar says that for the first time in his experience he saw the sea filling the crow's nest on the foremast. Considerable damage was done about deck by the heavy seas and some thirty feet of port bulwarks were carried away to the deck, the steam pipes connecting the winches, etc., were smashed, while the sailors and firemen were washed out of the forecastle, and for five days have been living in the stokehold. When the steering gear gave way and it was seen that temporary repairs could not be effected, it was decided to bear up for St. John's.

Cargo Shifted

To add to the troubles, the cargo of pig iron shifted, throwing the vessel out to the starboard at a very dangerous angle and threatening to send the ship and her crew to the bottom. For over twenty-four hours at a stretch, the crew had to work in the holds, in an endeavor to get the ship back on an even keel. Some 400 tons of cargo were shifted, while many tons of water were pumped into the port ballast tanks, and even then the ship had a bad list.

Assistance Sent

On Saturday evening at 6 o'clock the steamer was 20 miles S. S. W. of Cape Spear, when she wired her agents Messrs. Harvey & Co. asking for assistance. The company arranged to send the tugs John Green and Hugh D., and the tugs left port at 9.30 having in tow the pilot boat while Mr. J. Walsh of Harvey's also went out by the Hugh D. The Craigness was about 15 miles off port, heading to sea, to again have repairs effected to the steering gear. By means of flare-ups the tugs located the disabled ship about ten miles off the narrows, she having come again to land during the couple of hours that were occupied in repairing the steering gear. About midnight a line was placed aboard the John Green. The tow, however, had scarcely begun when the weather became thick, the wind freshened from the S. W., and the tug had to slip the tow line while the Craigness again headed to sea for the night. The Green stood by in the bay all night, while the Hugh D. returned to port with the pilot boat, leaving Pilot Malone on board the steamer. Toward daylight the wind veered from the N. W., and at 8 a.m. the ship was picked up by the John Green, Hugh D., and Moulton and at noon the weary and fatigued mariners were safely anchored in port.

Second Mate Injured

While repairing the broken steering gear on Saturday night off Cape Spear, the second mate had his leg badly wrenched and bruised, and he suffered much pain. On the ship's arrival he was attended by Dr. Campbell.

The Craigness was formerly the German steamer Schwaben and is owned by Sir Wallace Reardon Smith of London. She is 5,098 tons gross, and 3,940 nett, and was built in Germany in 1906. Capt. Stellar, his officers and crew, are to be congratulated on the splendid seamanship which brought the ship safely to port.

FISHERMEN'S DEMANDS SATISFIED

The demands of the fishing crews of over one hundred schooners laden with Labrador codfish, as noted in the November number of "Canadian Shipping," have been satisfied, and the main body of men left for their homes in Bonavista Bay on December 8th, by the government steamer "Prospero." Owing to the lateness of the season, the skippers decided to leave their vessels moored in St. John's harbor for the winter. They will come along in the early spring and equip them for the prosecution of the 1923 voyage, providing conditions improve. If not, there will be an appreciable falling off in the number of men and craft taking in the codfishery on Labrador next year.

Halifax, Nova Scotia.—The port of Halifax experienced a record month in October in the matter of shipping tonnage, exports, imports and building permits, as compared with the corresponding month a year ago. Gross shipping tonnage in 1922 amounted to 207,738, as against 171,105 tons in October, 1921. Exports and imports during October totalled in value $1,473,609 and $1,111,609, as compared with $1,007,960 and $971,512 respectively in the same month a year ago. Building permits totalled $401,436 in October, 1922, compared with $164,864 in October, 1921.

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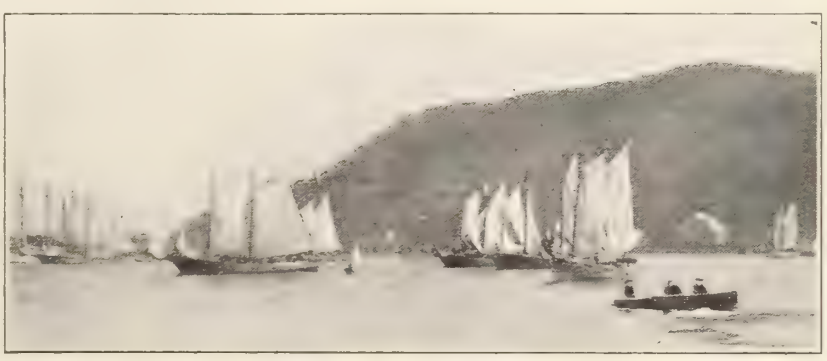
Montreal, Que.—Loaded with five million feet of lumber to be used for the extension of the wharves in the eastern section of the port of Montreal, a steamer has arrived here from Vancouver with the largest cargo of its kind that ever entered the harbor. The cargo consists of British Columbia fir, in size 12 in. by 12 in., and varying in length up to 60 feet.



Fishing Fleet After Arrival

News From Quebec and the Maritimes

FROM OUR SPECIAL CORRESPONDENTS

QUEBEC.—The official closing of the season of navigation on November 25th does not mean that the navigation of the River St. Lawrence from Quebec came to an end on that date. It means that the underwriters will stop insuring vessels in the St. Lawrence trade after November 25, notwithstanding that navigation is possible and safe to the 31st of December and even after that date. Ocean steamers, three in number, one loaded with lumber and two engaged in the coal trade, sailed from Quebec, December 11, and reached the open sea in safety. Floating ice appeared in the river in the second week of December but did not menace the movement of ships in the least until the 15th. By this time the channel west of Quebec, leading to Montreal, became choked while at Quebec the floating ice extended and still extends to the mouth of the Saguenay and east of that there is practically clear water. A remarkable feature this season was the sudden formation of the floating ice in the river, during the open fall and fine mild weather. A cold spell for a couple of days caused the formation of the ice and, strange to say, it became hard as stone.

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The steam bargs, John S. Thomas, arrived in Quebec, left Cleveland during the second week of December, sailed safely through the Great Lakes and canals to Montreal, and was arrested at the latter port for one day by a snowstorm. At this time there was very little ice in the channel west of Quebec and when the snowstorm cleared, the John S. Thomas left Montreal to go into winter quarters at Quebec. In the meantime, the ice in the channel had quickly formed and the steam barge got within two miles of Sorel when it was suddenly caught in an ice jam that hemmed the boat in so that it could not budge. Two government tugs at Sorel went to the resuce and worked two days butting the jam before they could reach the John S. Thomas and break a passage to put into Sorel. She is now in winter quarters.

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The shipping at Quebec was not as satisfactory this year as the port deserved. Only 366 inward and outward vessels with a gross tonnage of 3,354,-268 were served at the port, in comparison with 173 vessels and a. gross tonnage of 2,116,044 in the season of 1921. The increase is due to the shipment of timber and deals, 100 per cent. over the previous year.

The coasting trade, including Great Lakes vessels, served at the port during 1922 number 223 vessels with a gross tonnage of 208,125 in comparison with 206 vessels and a gross tonnage of 184,-742 in 1921.

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The shipment of grain from Quebec elevators only amounted to 2,000,000 bushels, a tragic result when one considers the large volume of grain shipped by way of Buffalo to American ports and the congestion at Montreal. It is a remarkable fact that the grain shipped from Quebec was railed over the C. P. R. while not a pound of cereal came over the Canadian National Railways, while the government railways in November were transporting grain to the Portland and even to the St. John, N. B., elevators. A decided change is looked for during the next season of navigation of St. Lawrence.

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Shipping Mishaps

Navigation of the St. Lawrence did not come to a close without a number of steamer mishaps. The most serious was the grounding of the Canadian Pacific steamer Montcalm, which occurred in June, a short distance below Three Rivers in the Montreal channel. She was hauled off with the assistance of the Quebece Salvage and Wrecking Co.'s steamer Lord Strathcona and a fleet of tugs. The Montcalm was damaged considerably. She was docked in the Quebec drydock at Lauzon and repaired by the Doxie Shipbuilding Co., who had to replace quite a number of plates. The big steamer was out of commission for some time.

The steamer Selma was the next vessel to touch bottom in the Saguenay River, June 8, but managed to get off by her own steam before assistance reached her. The most serious accident happened with the Canadian Government merchant marine steamer Commander, which ran ashore and became flooded fore and aft August 3, at Miquelon Island. The Lord Strachona with the wrecking schooner G. T. D. were dispatched to her assistance and after some weeks managed to raise her with the aid of compressed air and pumps. She is now receiving permanent repairs at Montreal. The salvaging of the Commander is said to be a remarkable piece of work by the Quebec Salvaging and Wrecking Co., as it was thought she would have to be abandoned as a total loss.

Next came H. M. S. Raleigh, which went on the rocks at Pont d'Amour in the Straits of Belle Isle, and had to be abandoned by the Admiralty at a total loss. The Lord Strathcona went to the assistance of the war vessel and remained by her fourteen days, during which time the weather was so rough with the sea breaking over her that it was with dificulty that inspection of the damage could be made. When it was made and reported to the admiral he gave orders to abandon the ship. The crew was later transported home to England on a C. P. liner.

The steamer Baluchistan, which left Montreal with a fresh cargo of grain and miscellaneous freight, was the next to meet with an accident. It went ashore during the night four miles west of White Isle in the lower St. Lawrence and after some days of strenuous work was hauled off and out into deep water by the Lord Strathcona. She proceeded to Quebec and discharged her cargo and afterwards repaired in the drydock.

The steamer Mangihen was the next to meet with an accident by going ashore four miles south west of Anticosti. The Lord Strathcona went to her assistance but was called off as the owners decided to abandon her and the ship will be pounded to pieces during the winter.

The steamer Cairndhu was the last accident to take place. With a cargo of 7,000 tons of grain and produce the ship left Montreal November 21, in charge of Pilot J. Otto Gariety, 21 years in the service and who never, previously, had an accident. The steamer was opposite Portneuf when she ran on the rocks on the north side of the river. This was at 7.30 o'clock at night when the snow was falling and there was a mist. but the pilot thought he was a quarter of a mile away from the shore. It took one week to get the steamer off the rocks. In the meantime 3 000 tons of cargo had to be lightered after which she came off easily. The ship was brought to Quebec, unloaded and then proceeded to the government dry docks. The contract for permanent repairs was awarded to the Morse Shipbuilding, in New York. Temporary repairs were made by the Doxie Shipbuilding Co.

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Preparing For Canadian Grain

With the aid of the G. T. R., who have helped develop the Port of Portland, Maine, and own grain elevators at that point, Portland will be further developed to handle Canadian grain. A concise statement has been published in the New York Maritime register which carries a directory of the shipping Port of Portland, Maine, by the directors of that port calling attention to the facilities and advantages Portland offers to

the commercial trade of the country and the British provinces.

Portland has for many years cultivated the export of Canadian business and especially grain, and the G. T. R. has spent a great deal of money to develop those facilities. It is now getting ready, with the hope of assistance from the Canadian National Railways, to build up a greater export of Canadian grain and general cargo at the expense of the Canadian winter ports of St. John and Halifax. Portland is even reaching further in its ambition to develop its shipping trade not only in winter but in summer seasons, in competition with the Canadian summer ports of the St. Lawrence. Ship owners and operators as well as exporters and importers are showing a deep interest in the development now under way at the Port of Portland. Heretofore, practically all the export and import traffic moving through the Port of Portland has been of Canadian origin or destination and has moved almost entirely in connection with the G. T. R., now a part of the Canadian National Railway system. This traffic has been confined almost entirely to the winter season or that portion of the year when the Port of Montreal was closed to navigation by ice conditions in the upper St. Lawrence. Like many other port cities those that have an interest in the commercial expansion of the port feel that, in order to bring about a general and constant use of the port and its facilities, public ownership of at least a portion of the water front properties was necessary.

In line with this view, the State of Maine is financing the cost of construction of a state pier which is nearing completion and will be available for use early in the spring of 1923. This pier will be equipped with the best known freight devices including electric trucks and trailers and electric freight pilers. In addition to these, grain gallery connections will be made with the G. T. R. elevators. It is estimated that bulk grain loading can be done at the state pier at the rate of 15,000 bushels per hour. In the meantime, the New England Development Co. has for some time been working with New York interests at Troy, N. Y., with the idea of having a terminal for the barge canal on an extensive scale, including a grain elevator and storage warehouse at Troy or some nearby point that would be tributary to the New England railways with the possibility of the New York State Canal affording additional transportation facilities for New England and the Port of Portland, thus relieving congestion of the railways.

In consideration of the ambitions of Portland to catch a share of the western grain, especially Canadian grain, the president and new board of directors of the Canadian National Railways will be remiss in their duty to Canada if they do not watch these transportation features and look to the shipment of Canadian grain to Canadian ports. It is a big question in the interests of Canada and may be solved through the good will of the Canadian National Railway managers.

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The shipping at the port of Quebec during the past season was better in volume than in 1921. There arrived in 1922, 366 sea-going vessels with a gross tonnage of 3,364,268, in comparison with 173 vessels and a gross tonnage of 2,116,044 in 1921. In the coastal trade, including Great Lakes, there arrived and departed 223 vessels with a gross tonnage of 208,000, with 206 vessels and a gross tonnage of 180,742 in the navigation season of 1921.

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By making Quebec the terminal point, it is believed that the season of St. Lawrence navigation may be lengthened by at least two months. In proof of this it may be remembered that when the Canadian government steamer Voyageur 4,100 tons, and the Pioneer 8,000 tons, were launched at the Vickers shipyard in 1918, as the ice was forming in the river they were hurried to Quebec and sheltered in the Louise docks tidal basin to have their machinery installed. The steamer, Voyageur, completed, steamed out of port January 21st and reached Halifax safely. The Pioneer, completed in the end of February, was ready for sea, and if orders from Ottawa had arrived could have proceeded to the open sea as the Voyageur.

Quebec has two modern stone graving docks, one 600 ft. in length and the other 1,150 ft., with an entrance width of 120 ft. The latter is one of the largest docks in the world.

OPENING SPRUCE FORESTS

Quebec city has become the centre of the pulp and paper trade in consequence of the construction of the Quebec and Lake St. John, the Great Northern, as well as the Quebec and Saguenay railways which give access to the great spruce forests and water

New Champlain Dry-Dock, 1,150 ft. long by 120 ft. wide, at entrance in Quebec Harbour.

powers of the St. Maurice, the Lake St. John and Saguenay district. It is estimated that nearly $100,000,000 has been expended in industries in the valleys of these rivers, and these industries furnish employment in all occupations to 20,000 men. The same expansion is being carried on along the line of the transcontinental railway where more than 15,000 new settlers have been established and are prospering in the fertile clay belt of the Abitibi district.

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In the further development of the water powers of the Grand Discharge in the Saguenay district, the Quebec Development Co. has been awarded the contract for the big dam, to take three years to build. The Price Brothers Ltd., Quebec, and Duke interests of New York are losing no time in giving out the preliminary contract for the building of the first section of this gigantic work. It will furnish 200,000 horsepower and will cost $12,000,000. The balance of the work will develop 800,000 horsepower or a total of $1,000,000. When all the work of development is completed three years hence, the total expenditure will have amounted to $57,000,000. Although legislation was passed only a couple of weeks ago to furnish the colossal enterprise with government aid and that the company have two months to begin work, contracts have been already given for the grading and trestle work on the railroad from Herbertville to St. Joseph D'Alma and crushing machinery for the road bed has been ordered. The company has also awarded contracts for piers, foundations and railroad bridges across the Little Discharge and over the small branch of the Saguenay River. The Development Co. is also engaged in making contracts for camps, cofferdams, storehouses, and arrangements are being made to start a number of men on the ground. The Price Bros. Ltd. have arranged to lease 200,000 h.p. for the whole of the first section when completed for the operation of their paper and timber mills which will, it is estimated, save the company $1,500,000 per annum on their present cost bill.

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The development of the waters of the Saguenay Grand Discharge will undoubtedly enhance the shipping interests of the port of Quebec. It will more than double the capacity of the Price Bros.' paper and lumber mills, feed ships at the port of Quebec, besides increasing the population of the Lake St. John and Saguenay district.

St. John Notes

The winter port of St. John opened with a rush, the harbor berths being filled to capacity, and a number of steamers had to await in stream for berth facilities.

The first Manchester line steamer Manchester Producer arrived Nov. 27th from Manchester.

The Canadian Government Merchant Marine officially opened their winter season by the arrival of the Canadian Victor, Dec. 7th, from Australia and New Zealand via New York and Boston.

The first Canadian Pacific passenger steamer, S. S. Marburn, formerly the Tunisian, arrived November 26th from Liverpool and their first freighter S. S. Dunbridge from London, arrived Nov. 24th. This was also the first winter port freight ship.

Repairs to the C. G. S. Aberdeen were completed in St. John and she sailed on Saturday December sixteenth for Halifax. She will go into drydock there for a complete underwater examination, and will probably return to St. John before the first of the year ready for service.

The tug Murray Stewart, which was sold recently by Messrs. Nagle & Wigmore to the Marine and Fisheries Department for service in the Great Lakes, has been replaced for the winter season by the tug F. W. Roebling, which arrived at St. John, December sixth from Halifax in command of Captain Turner.

The Furness Line have also started a new service to Hull, fortnightly, returning with cargo from Hull and London.

Large quantities of laths are also being shipped by steamer to United States ports. In general business is exceptionally brisk.

On the whole imports and exports are far heavier up to the present than they were for a like term last winter. The Manchester Line have doubled their service from a fortnightly one to a steamer a week.

The C. G. S. Dollard arrived from Halifax to work in connection with the Marine and Fisheries Department. She is lifting buoys at the head of the Bay of Fundy, in the Minas Basin, and in the Avon River, in preparation for the closing of navigation for the season.

The tug Florence arrived from Montreal after an extremely rough passage, through the gulf and along the south shore of Nova Scotia. The Florence has joined the winter port fleet of the St. John Dry Dock and Construction Company, Limited.

From present indications, this winter traffic should exceed that of the past winter. Large consignments of grain are moving via this port, and the elevators are being run to capacity. Chartered cargoes of potatoes move regularly to Cuba, on an average of one steamer a week. Considerable flour is also clearing for overseas. The steamer Bogstad carried a cargo of flour and grain to Rotterdam and Hamburg. Large quantities of sugar are being imported for the local refineries. Cargoes of coal are also arriving from Cardiff, etc.

M. de Verneuil, consular general for France, with headquarters in Montreal, while on a business trip to St. John on December fourth, was taken on a tour of inspection of the St. John Dry Dock and harbor facilities.

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Yarmouth, N. S., Nov. 28.—The Weymouth schooner Lucille B., sixty-seven tons, dragged her anchor at Port la Tour in an easterly gale at two o'clock this morning and ran ashore. She had just completed loading 165,000 pounds of dry codfish for Gloucester.

Dec. 5, 1922.—The schooner Natalie Hammond reported at Shelburne, N. S., yesterday that the American schooner Jessie L. Leach, coal laden, had foundered near Thatcher's Island on Saturday morning. The crew of four men were picked up by the Hammond from a motor boat.

The Canadian Pacific steamship Metagama which arrived December eleventh, encountered an exceptionally severe storm en passage. At times the wind reached a velocity of 100 miles per hour, and during the storm the wireless aerials were blown down and two of the life boats were damaged.

Mr. Trevisa Clarke of Londonderry, Ireland, a director of the shipbuilding firms of Swan & Hunter, Wigham Richardson, and managing director of the North of Ireland Shipbuilding Co., was in St. John en route to England via New York. While here he was taken on a tour of inspection of the dry dock. Mr. Clark, who has travelled extensively, was very favorably impressed by the St. John facilities.

Halifax, N. S., Dec. 18.—The Newfoundland Government steamer Prospero was ashore on Horse Island, Green Pond, Newfoundland, according to a wireless message received here on Saturday evening from the White Star liner Baltic via Cape Race. The Prospero is a steel steamer, 599 tons net and 204.8 ft. long, built in Glasgow in 1904. Green Pond is about 100 miles south of St. John's. One hundred and twenty passengers of the Prospero were safely landed and the vessel was refloated later with two holds damaged.

The Manchester Line steamer, Manchester Regiment, made her first trip to St. John, arriving Dec. 12th. She is in command of Captain Foale. The Regiment is the newest steamer of the Manchester line and is the latest in cargo carriers making a speed of 15½ knots. She was built by Furness Shipbuilding Co., Ltd., Haverton Hill on Tees. She is 7,680 tons gross and 4,780 tons net. While in port a dinner was given on board, and representatives of various local firms and steamship interests were present.

THE British Columbia Coast Service of the Canadian Pacific Railway has awarded to Yarrows, Ltd., Esquimalt, the contract for the building of a ferry steamer to ply between Bellingham, Wash., and some point on the Saanich peninsula of Vancouver Island. The cost of the vessel will be about $200,000 and it will be the first internal combustion motor craft in the services of the Canadian Pacific in any waters. It is expected that the use of Diesel motors will reduce the cost of operation by nearly two-thirds. The new steamer will be capable of developing a speed of fourteen knots an hour and will make the forty-mile route in about three hours. The construction job will be rushed, as the steamer is to be put in commission early in May to take advantage of the rush of motor tourists between the mainland and the island during the summer. The dimensions of the craft are to be 170 feet over all in length, 43 feet beam, and 11 feet moulded depth. The ferry will have a capacity of from forty to fifty cars and will carry up to 250 passengers.

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Capt. Harry Crosby, Seattle shipping man, who operated the ferry steamer Harvester King between Anacortes and Sidney last summer, is now building a larger vessel for the same route, to be operated next summer in competition with the C.P.R. craft.

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Amalgamation of the two principal pilotage bodies on the Canadian Pacific coast, the B. C. Pilotage Association, Ltd., and the Vancouver pilots which was believed to be a certainty two or thre months ago, is now apparently as far from materialization as ever. Differences have developed between the two organizations and a rate cutting war has been commenced, affecting the Gulf of Georgia ports principally, including Genoa Bay, Chemainus, Ladysmith, Boat Harbor and Blaney. Several independent one-man pilotage concerns have sprung up lately and are apparently taking a good deal of the business offering. Shipping men are satisfied with present conditions, as they feared that amalgamation of the two services would eventually lead to a renewal of the fight for compulsory pilotage, a system which was discarded some years ago after a long controversy.

The Turpel Marine Railway Company, pioneer Victoria shipbuilding concern, has resumed its former site on the industrial area of waterfront of Victoria West. During the war the company leased its yards and land to the Foundation Company, which was engaged in building wooden ships for the French Government and the Imperial Munitions Board. The two Turpel brothers and W. G. Noury are the principals of the Turpel Company.

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One of the most satisfactory jobs ever accomplished by the Pacific Salvage Company was the salvaging of the motorship Guerrero, which was driven ashore at Mazatlan by a hurricane on October 15. The Pacific Salvage Company, of Victoria, dispatched the steamer Algerine, which has just returned to port after towing the Guerrero to San Pedro.

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That Vancouver will soon be comparable to Montreal in the volume of grain shipment handled for export is indicated by the growth of the wheat movement through the Pacific coast port this winter. Last year seven million bushels passed through Vancouver's elevator, and this year it is expected that more than double that quantity will be handled. Some authorities predict that Vancouver will pass 25,000,000 bushels, but that will depend on the accommodation of the elevator, which has already proved absolutely inadequate to meet demands of the traffic. So far this season, over 250,000 tons of wheat have been booked for shipment to Europe, and 50,000 tons have been ordered by the Orient. Vancouver, for the first time in history, is now a chartering port and eighteen tramp steamers have been chartered to load full wheat and lumber cargoes during the last six weeks.

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The new Ballantyne pier, being built in Vancouver by the Dominion Government at a cost of about $5,000,000, will be completed by mid-summer next year, according to present expectations. The new pier will give berthing accommodation for seven vessels and will be an important addition to the port's at present inadequate docking facilities. The pier is being built in two sections.

Construction of the new C. P. R. ocean dock at Vancouver is to be commenced at once. The total cost of the project will be $2,000,000. The plans have been formally approved, and the company plans to have the dock ready for use in a minimum of time, owing to the rapidly increasing business of the port, especially in relation to trans-Pacific trade.

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Most of the preliminary construction has been completed in respect to the Esquimalt drydock being built by the Dominion Government at a cost of about $5,000,000. Just when the dock will be ready for use has not yet been announced and at present operations are not proceeding very rapidly, although the job will be speeded up in the early spring.

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The lumber export business has been good and this has resulted in a better demand for offshore tonnage. Australia has placed large orders in the British Columbia market lately, and it is expected that if Canada succeeds in her present effort to obtain preferential tariff treatment by Australia, British Columbia's exports to the southern dominion will amount to 500,000,000 feet annually, or about three times as much as the present total export trade of the province to all countries. The lumber trade with Japan has been disappointing this year, but huge shipments have been made to the Atlantic seaboard by way of the Panama Canal and this movement is expected to be permanent, with a gradually swelling volume of business from year to year as the demand grows for Pacific coast lumber.

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The Provincial Legislature has co-operated with the port of Vancouver in urging Federal construction of a new grain elevator at Vancouver. According to reports from Ottawa, the elevator will be placed under the jurisdiction of the Vancouver Harbor Board, which will immediately take steps to increase the capacity of the present elevator Plans are now being put in effect for bringing about a closer co-ordination between the Vancouver Harbor Board respecting wheat shipments and the Canada Grain Board, whose representatives were recently in Vancouver.

Large Double Acting Two-Stroke Engines

Complete Analysis of Different Types of Engine, Dealing With the Methods Adopted to Remedy Various Troubles, and How the Design Has Been Benefited by the Experience Thus Gained

By A. E. L. CHORLTON, C.B.E., M.Inst.C.E., M.I.Mech.E., M.I.E.E.

THE development of the internal-combustion engine during the last decade has been much more in the use of liquid than in gaseous fuel, although in the previous ten years the latter probably received the greater attention. The internal-combustion engine using liquid fuel has become the prime mover for all forms of transportation. In the air it is supreme; it is equally so for road service; on the sea its progress is most marked; curiously enough, for transportation by rail, where its possibilities are great, but little has been done.

For marine work the engine has rapidly grown very considerably in size due to the increased powers required, and the lower propeller speeds preferred. Up to now the use of the single-acting engine has been almost universal, but the time has arrived when the high first cost and heavy weight have practically compelled engineers to turn to the double-acting type as an avenue of relief. In this development there is no doubt that the four-stroke will receive as much attention as the two-stroke cyle; but, as the author's experience with double-acting engines has been principally with the latter type, he will confine himself to it in this paper.

Pre-War Standard

In land practice for the largest powers, the double-acting principle had become practically standard before the war, the larger proportion of the engines being of the four-stroke cycle type. This was, in the main, due to the higher speeds at which they could be run—an important point when the driving of electric generators is considered. The two-stroke operated better at the lower and variable speeds, required for blowing engines, etc.

It is hoped that the practical experience made previous to the war with the two-stroke type, as reflected in the progressive design of the main parts, will be interesting and of service to designers now engaged on the problems connected with the double-acting oil engine. These double-acting engines used gas as a fuel insteadof oil, and though this means that some allowance must be made when translating the practice from one fuel to the other, it does not otherwise very materially affect their comparative value, for the mean pressures used are much the same (possibly less). The total heat passing is greater for the gas, though the maximum temperatures and pressures are less.

The fluid factors governing the design of two-stroke engines—as the disposition, shape and areas of inlet and exhaust ports, form of cylinders, amount of scavenging, exhaust pipe and its reactive influence, etc.—are of fundamental importance, but it is not proposed to deal with them in this paper. The object it to treat the subject purely mechanically; in brief, to take the parts of the engine, one by one, giving the original design, experiments made, and the final design resulting therefrom. That is to say, it is confined to factors of design.

Type of Engines

One may, with advantage, first examine briefly the types the double-acting two-stroke-cycle engine may be grouped under. It may be either valve scavenging or port scavenging, and of the following forms:

(1) Single piston, single piston rod.
(2) Single piston, double piston rod.
(3) Double piston, single piston rods.
(4) Special.

Originally, the majority of two-stroke engines employed mushroom-shaped air valves placed at the cylinder ends with exhaust ports at the centre; then followed the opposed-port-scavenging type. Will there be a reversion to the valve type when the double-acting marine oil engine is evolved? The author very much doubts it, as the valveless engine is very attractive.

(1) That objection to the first type is principally that the combustion chamber at the crosshead end, due to the piston rod, is not of an altogether desirable form for the high-compression oil engine, probably requiring the use of two fuel injectors. On the other hand, it is the most standard form of any double-acting, reciprocating prime mover, and hence, appeals strongly to the engineer.

(2) The type with two rods from the piston to a common crosshead, is adopted to surmount the foregoing restrictions; that is, it gives a better combustion chamber, and therefore, will be preferred by some. Its objections are possible unequal expansion of the two rods with the consequent strains that may be set up, extra cost, and that two piston-rod packings per engine are used.

In both these types when opposed-port scavenging is used, the double amount of heat passing the customary ports and bars, must have a material effect (hot one side and cold the other), and this is probably the main reason which appears to deter single-acting advocates of the two-stroke cycle type of engine from venturing into double acting. Ports at the cylinder ends or valve scavenging overcome these difficulties, the latter being particularly dealt with in what is to follow.

(3) In the double-piston duplex-cylinder type, the first difficulty, long ports and bars unequally heated, is overcome and also a suitable combustion chamber provided at the crosshead end of the cylinder. Two piston-rod packings are, however, required. The two cylinders per crank may be considered a gain for large powers, on the score of heat flow, whilst the scavenging, as against the opposed-port type, should be superior. The standard type has a common crosshead for the two piston rods and a variation of it has a connecting rod for each piston. This latter, due to the offset cylinders, gives one piston a lead over the other, allowing of some supercharging; but it has the disadvantage that in reversing the lead is negative.

Evolution of Design

Turning now to the main object of the paper, we may consider the evolution of design of the principal parts of the engine as follows:

Cylinders. Piston rods.
Cylinder covers. Piston rod packings.
Pistons. Crankshafts.
Piston rings. Materials, etc.

Their relative importance depends somewhat on the point of view, i.e., time before replacal or first cost only. In the years the author was engaged on the large two-stroke engine, perhaps the piston-rod packing was the most difficult proposition, as regards time, i.e., frequency of renewal and adjustment; but as to actual failure coupled with first cost, he would place pistons first, cylinder covers second, and cylinders third. At the end practically the whole engine design had become standard save the packing. This part is, therefore, dealt with at some considerable length with sketches of types, later in the paper.

Cylinders

Two-stroke double-acting cylinders, according to the classes already mentioned, may be for valve or port scavenging, single and duplex. with some special types, of which probably only experimental engines have been made. The experience of the author was first in connection with cylinders of the valve scavenging type, and later with duplex cylinders port scavenging. He has had experience with the opposed-port type, but not double-acting. The cylinders of the double-acting valve-scavenging engine, in the earlier examples, follow-

ed out the practice then coming into vogue for other large four-stroke internal-combustion engines; that is to say, they were cast all in one piece. This was undoubtedly a difficult casting from the foundry point of view, apart from any considerations that might arise due to the stresses set up when the cylinder was in use in the engine.

In the larger sizes the cylinders were very long, over 8 feet for an engine of 750 h.p. and the jacket cores complicated, due to the exhaust branch with the ports having to be cast in. The main barrel core was in itself to get an absolutely clean surface of dense metal for the bore with a suitable metal in the jacket, and it became a difficult undertaking; the difficulty was to balance this requirement with that of the strength required in the jacket in order to withstand the requisite water-test pressure.

In the earliest cylinders, therefore, it was the custom to use a fairly strong iron, but sufficiently high in silicon to obtain freedom of flow to ensure a good casting. The hard and dense face of the metal for the bore was obtained by entirely covering the barrel core with chills made in small squares of 2 to 3 inches and about ½ inch thick. Many cylinders were cast of this type and in practice gave successful results. The reason for the change from the single-piece cylinder was in the main due to questions of renewal, when the bore had worn; this was usually aggravated at the exhaust ports. It was also desired to get a harder working surface.

Liners in Cylinders

The next step, therefore, was the insertion of liners. By this means the mixture for both the main housing and the liner could be made suitable for each purpose and the exhaust ports could be machined in. In principle, a liner seems simple until the extra expansion is thought of. This was undoubtedly a considerable deterrent; so much so, that the builders of four-stroke engines kept to the single-piece cylinder for a long time after the manufacturers of the two-stroke type had commenced fitting liners.

In the two-stroke by dividing the liner about its centre and inserting it from each end, the expansion trouble was overcome. The difficulty that arose with these liners was that they were put in rather too tight, and in service owing to the expansion due to the heat they burst in the outer casing. Ultimately, it was found that the forcing pressure should be practically only that which could be put on with a couple of through bolts. Ordinary rubber sliding joints were used at the centre and were quite satisfactory. The liner itself was split either through the exhaust ports or preferably in the housing joint at one side of them.

The wear that took place over the long bars of the exhaust ports in the early engines was serious. These bars wore quickly, causing the cylinder to become barrel shaped and resulted in the rings catching in the long ports and breaking. Another difficult was that with the long uncooled bars between the ports, cracking almost invariably took place. In considering the somewhat rapid wear that occurred in the early engines, inefficient lubrication and inferior oil must not be lost sight of, apart from unsuitable material, etc.

Cooling Bars to Prevent Wasting

The question of cooling the bars was considered and tried. The proposition is not an easy one. In all these designs, the increased thickness of metal at the end of the cylinder at the juncture of the liner and jacket is objectionable, owing to the high heat flow, and considerable ingenuity has been exercised by oil engine designers to overcome it where the joint is made with the cylinder cover. This feature of most designs is probably a greater disadvantage for the nigher compression oil engine, than for the lower compression gas engine with the larger combustion chamber.

With the experiences made with this type of cylinders, the author designed a duplex cylinder. The first consideration in this design was to do away with the double-wall casting throughout, and to adhere as much as possible to simple pipe-like forms. The casting then could be made of the most suitable material and free from initial foundry strains. The cylinders are split about the ports and form simple U tubes bolted together. Such a form of engine enables port scavenging to be adopted and in effect the scavenging is superior, from the fact that no by-passing to exhaust will occur. The cooling round the combustion chamber is good and no difficulties arise from the thick metal at the joint such as the early engines had and as is common in engines with removable covers. As against this the engine is more difficult to dismantle, from the fact that the complete top half of the U shape of cylinders must be removed to expose the pistons.

Marine Engines Converted

The earliest application of the duplex principle was for the conversion of several triple-expansion marine steam engines. Ultimately, it could hardly be said that this engine gave good enough service to continue in everyday use, but the main difficulty was due to the nature of the gas used, i.e., it was too dirty and gave trouble with the piston-rod packing and the pump valves.

Looking at this conversion from an oil-engine point of view, the author thinks that a more successful engine would have resulted than with gas, if the compression pressure had been kept low, for an oil engine is an easier proposition than a gas engine due to freedom from dirty gas and late fuel injection (freedom from pre-ignition). Actually, though these engines would be said from current Diesel practice to be much too light (even taking into account the difference of compression), they did not show this in service. Where they did fail other than as mentioned, was that the crosshead arrangement did not allow of the ready adjustment necessary always to maintain the piston rods running dead true, an essential for internal-combustion engines.

When considering the application of the duplex-cylinder engine, one might say that with the use of high-conductivity alloy pistons, cylinders of 24-inch might be adopted without water or oil cooling, giving a total h.p. per crank with a moderate m.e.p. of over 1,000.

Cylinder Covers

The cylinder cover of the combustion engine using gas, and not exceeding, even with blast furnace gas, a compression pressure of 175 lbs. per square inch, is probably, when compared with the oil engine, less similar than any other part. The heat transfer may be greater, but the pressure loading is less, and though this is true, as has been stated for other parts, it is more concentrated in the cover. Furthermore, due to the difference in clearance volume there is a very material difference in design. The different duties of a cylinder cover, heat and pressure, have led designers to divide the cover into two parts, putting in front of the pressure portion a heat absorbing pad. The valve openings make an undoubted complication. For the opposed-port type or the duplex, with but one opening at the end, it does not seem necessary to adopt the double type.

The practical experience made with valve scavenger covers was somewhat similar to that with the cylinder. Thus the covers were originally cast without any allowance for variation in expansion in casting and working, i.e., both skins of metal were tied together in more than one place. A very important point is to see from actual close inspection, that the cores in the mould are always accurately placed to ensure perfectly even metal all over for every casting. In practical effect, any works manufacturing internal-combustion engines should have its own foundry.

Relief or safety valves were used in the early engines, but in the later ones they were discarded, as they were always a nuisance from leakage, etc. Will the oil engine follow suit? It seems that with the engine using a compression of 300 lb. or even lower, this may possibly be looked for. Thus, with a moderate compression and an easy rating, it should be possible to use successfully a simple and inexpensive form of cover.

Pistons

Probably the piston was the part in the earliest two-stroke double-acting engine which gave the most trouble from failure. Many failures from cracks took place, the cause of which it was often impossible to diagnose, and as all pistons were water cooled, a crack meant immediate shut down; thus, to

overcome this, all manner of variations in design were tried; thicker ribs, thinner ribs, radial ribs, tangent ribs, no ribs, in one part, in two parts, with a through rod and back nut, with a palm end on the piston rod, etc.

In a two-stroke engine of the single-acting type, the need for closing the ports during the stroke involves a piston of more than half a cylinder in length. In a double-acting engine, however, though this is considerably reduced, the question of provision for expansion is more important, because of the increased heat flow (two ends) and that power in alternate directions has to be transmitted. The variation in expansion between the cool ribs and the exterior surface at the end exposed to the heat of the combustion was probably the cause of the cracking, though there may have been initial casting strain.

The pistons in the earlier engines were made of cast iron. Due to the many failures with the cast-iron piston, when the duplex type came to be developed, steel pistons turned out of the solid forging were used. Some early ones failed, but afterwards these pistons were quite successful. Anti-friction metal, sometimes in an adjustable pad, was frequently used to support the piston in the horizontal engine, and was undoubtedly a help in reducing wear and as a steady for the rings in passing the ports. It might be used in vertical engines for similar steadying purposes, or when steel [illegible]

As aluminum alloy pistons have proved so successful in many cases, diameters of over 20 inches being used, it seems quite possible that up to 24 inch diameter they will ultimately be adopted without any internal water or oil cooling. This would represent an undoubted gain, as the water or oil service gear to a piston is not an unmixed blessing. A suggested form of double-acting piston is made in two parts to allow for expansion and with the alloy in compression when under load. No studs or parts likely to loosen by expansion are used. In this case an uncooled piston rod will involve special care with the packing; that is, it should be water cooled.

Piston Rings

One fundamental difficulty in connection with all forms of metallic packing for internal-combustion engines—whether for the piston or the piston rod—arises from the fact that they always start up under considerable pressure set up on the compression stroke, thus differing from those on steam engines.

On the first revolution of the two-stroke motor, compression pressure occurs varying in intensity up to say 500 lbs. per square inch, and if the packing rings do not completely bed, and in consequence are not tight, the oil is blown away through the leaky port, creating an initial difficulty. In a steam engine, of course, at initial starting, only very low pressures are used, until the rings bed properly and are tight. This very important consideration is, in the opinion of the author, hardly taken sufficient account of.

For a small cylinder, accuracy and early tightness against leakage can be attained by grinding. This may apply to a piston rod for a large engine as well as a cylinder for a small one, but when cylinders of 24-inch diameter and over are reached, even if grinding were a commercial proposition, the cylinder would not remain true when heated up, if it were ground in the cold state. Thus, rings that are now supplied with a ground finish on the working surface may not fulfil what the extra expense involved is intended for.

In actual practice we find that, to obtain tightness in running (but, in the author's opinion, actually to attain a quick bed at starting) comparatively strong rings are used, exerting an outward pressure of 71 lb. per square inch, in some cases over, whereas in the large engines he was concerned with, this figure was ultimately reduced to as low as 2 lb. per square inch with advantage. We find further that as a characteristic of Diesel and high-compression oil engines, the first ring on the piston next the working face is placed much further back therefrom than in engines working with lower compression; this is more particularly against pressure than temperature.

The author suggests that by specially taking account of these factors more suitable rings may be used with less wear on the cylinder. The points to observe are:

(a) Light pressure rings to prevent wear.

(b) Quick bedding to prevent initial leakage.

(c) Joint pieces or overlap to prevent leakage to the back of the rings nearest pressure.

The piston rings for a two-stroke engine are a special problem. Either the rings must be designed to run successfully over the cut-away portions of the cylinder at the exhaust, or the ports must be so shaped and modified as to prevent wear and cause no disturbing or breaking action on the rings in passing over them. The integral strength of the ring is, therefore, important, and the first progress made, after many rings had broken, was to increase the section—this was a distinct improvement. The next step was to reduce the ports to a series of round holes. A different type of ring, narrow but deep, was developed by a German maker.

A form of ring made out of forged "Y" metal (aluminum alloy) has lately been tried quite successfully; attention is drawn to this, as it has the advantage of high conductivity and greater strength than cast iron, whilst it is of an anti-friction nature. Rings are sometimes made with channel section to reduce weight, and the inertia pressure at stroke reversal, i.e., prevent side wear. This part of the subject is dealt with at great length, as the success of the engine primarily depends on a tight piston with good lubrication.

Piston Rods

In the oil engine the initial pressures are higher than in the gas engine, and the effect may be to increase the wear on the inner part of the rod. In the early days rods were made of a more or less ordinary class of mild steel. Then the carbon content rose as high as .5. Nickel rods were also tried—all with a view to securing a stiff rod with a hard wearing face.

In one particular engine (duplex) two rods were used—one case hardened and one oil hardened. It was found that the case-hardened rod gradually developed circumferential cracks and ultimately failed, whilst the other rod ran for a long period. Generally, the rods had to be ground to a fine finish, etc., and it is essential that the method of attachment to the crosshead is such as to allow ready adjustment to enable the rod to be always kept running dead true. Carelessness in this respect means early failure of the packing and wear on the rod. Further, to steady and support the piston, tail rods were fitted (for horizontal engines); these were standard practice on four-stroke engines, and were also fitted to the two stroke, but the author's experience was that the long piston of the two-stroke fitted with an anti-friction pad did not require such rods, and ultimately they were dropped.

Metallic Packings for the Piston Rod

The metallic packing for the piston rod could hardly, after 10 years, be said to have arrived at a finality. Probably there is no part of the engine which has been so many times altered in design. The failure of the packings may be said to be due largely to the failure of the rod to remain parallel after a certain amount of running. In nearly every case after a few months of running it was found that the rod had worn (often very considerably) at the explosion end whilst it had retained its original diameter at the crosshead end. The problem, therefore, has been to pack a taper rod.

The wear at the explosion end of the stroke is no doubt primarily due to the heavy maximum pressure and higher temperature. It is influenced by the design of the packing—the lubrication of it, the cleanliness of the rod, the quality of the material, and the amount of intelligent attention it receives in cleaning and adjustment from the attendants in charge. Dirty gas or products (from incompletely consumed fuel oil) will cause wear of the packing and of the piston rod. On the other hand, considerable wear has taken place on the piston rods after comparatively short intervals of full-load running, when no dirt has been present. Lubrication is very important, but need not necessarily be made on multiple effect.

The following factors are fundamental:

1. Cleanliness of the gas. (For the oil engine this is secured).

2. Adjustable crosshead guides to permit of the rod being kept dead true.

3. Conscientious attention and adjustment from the engineer in charge.

4. A hard and truly ground piston rod.

The attention that the packings receive at the hands of the engine attendants is undoubtedly a very great factor for successful running. If there is one point certainly established by experience it is that piston rod packings will not run indefinitely without cleaning out and adjustment, and that regular and conscientious attention is of the first importance if satisfactory results are to be obtained.

When the packing is water cooled as well as the piston rods, carbonisation is probably minimized and the necessity of cleaning out becomes less frequent; but this type cannot be considered as essential if everything runs dead true, and complete combustion of the fuel takes place.

It is, of course, usual to design the packings so that the rings will float and allow for any slight want of alignment that may be caused by wear either of the piston or of the slides. How far this floating action—which necessarily implies the sliding upwards and downwards (or sideways if the connecting rod is not lined up properly) of each ring upon the next, affects the life and efficiency of the packing, is a matter of opinion, but it is true, that if the piston rod were in perfect alignment with the cylinder the motion of the rings upon their housings would not take place, and the end wear that is so detrimental, occasioned by this floating action would be eliminated.

To mimimze the end wear is very important, for, once the rings become slack in their cups, the packing will begin to blow, the lubrication will be impaired by the passage of the hot, and often dirty, gases, and the wear of both the packing and the rod, will rapidly increase. This point is borne out by experience, where if any end wear is immediately taken up and provision is made in the crosshead slides for adjusting any wear that may take place which will cause the rod to run out of truth.

If this adjustment were made a standard practice and promptly carried out, a packing which has the advantage of being easily taken apart without disconnecting the rod from the crosshead, might be the best solution of the packing question. Without such adjustment in the crosshead guides, this packing may not be so successful, since no provision is made for floating on the back rings, and therefore any want of alignment in the piston rod must necessarily re-act in a manner detrimental to the packing. This was probably the cause of failure in one case.

Generally speaking, a type consisting of solid rings at the back to break the force of the explosion, a spring in the middle, and white-metal rings at the front, and the end play to be automatically taken up on springs placed at different points in the packing, involves sets of rings of at least three different shapes and of several different sizes. This type is also more expensive to maintain than one having a similar ring throughout its entire length and of the same metal. The advantages of such a type are:

1. That a uniform pressure would be exerted upon the rod by each ring.

2. That as each ring would be interchangeable and standard, new ones could be fitted easily to any part that required them.

3. The rings could be made cheaply to the same gauge so that a reasonable number could be kept in stock.

A packing on the lines above mentioned was installed, phosphor and bronze and clip rings being used throughout. The faces were not ground, as is usual, nor was special lubrication adopted. The packing, however, proved successful, and worked three months under continual night and day load (equivalent to over six months of ordinary mill load running) without blowing. Isolated rings have required to be renewed from time to time, but being plain clip rings and all alike, they are cheap and easy to install.

A further point that has yet to be determined with certainty, is the relative merits of cast iron, steel, and phosphor bronze for packing rings. Cast iron rings have been more or less the standard in the past, and some German engineers have expressed the opinion that cast iron is the only suitable metal for an internal-combustion engine packing, and this continues to the present day, the metal being described as one that will not smear. This is important as the chief trouble that has been experienced with cast iron rings has been that no matter how soft the cast iron when first put in, after a short interval of running the surface has been glass hard. The result has been that the rods have worn, and the rings have not.

Phosphor bronze appeared to have much in its favor over either cast iron or steel. It has, however, been stated that phosphor bronze will not stand the temperature of explosion at the back end, and consequently is unsuitable for packing purposes, but it was the experience that, at any rate for reasonable periods, this metal was satisfactory, and even superior to cast iron.

Crankshafts

A short note on the practice in built-up crankshafts may be of interest. The author thinks he was the first to try built-up cranks on large two-stroke engines; the results were fully successful. Built-up cranks have now become standard practice. In the cranks referred to, great care was taken in the shrinking together as the shaft was not trued up after it was assembled on V blocks.

Efficient lubrication was one of the main factors in the successful running of large double-acting engines in the past. Until this problem was solved, the engines were unreliable, and considerable wear took place in the cylinder and on the pistons. Engines which had given bad service, gave, when fitted with a good lubricating system, results similar to those obtained with a steam engine, regularly running the full week without stop. One such engine which does this to-day was installed in 1904 (500 h.p. in one cylinder at 94 r. p. m.).

A point in the double-acting engine is that all holes of ingress to the cylinder are uncovered by the piston and exposed to the heat of combustion; this, in consequence, means more holes of ingress and less feed per hole, i.e., no excessive quantity exposed on the cylinder surface at any one point to carbonize. It is standard practice in single-acting engines to avoid this by not uncovering the hole.

A good lubricating system was found to require:

1. A good lubricator.

2. Multiple feeds into the cylinder and one plunger and pipe per feed.

3. Small piping (of steel).

4. Special back-pressure valve and cleaning out fitting to each hole on the cylinder.

The last is not the least important, but it is curious to note that at the beginning very expensive heavy oil was used, whilst finally it was quite cheap. The fundamental idea is to put in oil at as many places in the cylinder as you can afford and as little as possible at each place; then there is no excess to carbonize and a cheap oil can be used (possibly 2s a gallon). This system when finally carried out in complete detail, resulted in an astonishing change in the running of the engines, greatly reduced the wear, brought down oil costs and increased the reliability of the engine.

Materials

The materials of construction, particularly those used for the parts which receive and transfer heat, are of very great importance. They have, however, been dealt with several times during the last few years, notably by this institution, so that it is only proposed to deal with them briefly.

For the cylinder, cylinder cover and piston, heat conductivity is a very important factor in large engines, and internal strain in the metal due to temperature will obviously decrease if the heat gradient can be reduced. They may lead to the greater use of alloys of higher conductivity.

An aluminum alloy, used by the Admiralty, for the pistons of Diesel engines, contains 2½ to 3 per cent. of copper, 1 to 1½ per cent. of nickel, and ½ to 1 per cent. of magnesium.

For cylinder liners, forged steel may be preferred by some designers, using alloy pistons in conjunction with them.

Though exhaust-heat boilers do not bear any obvious relation to large two-stroke engines, still, for the reason that they may in the future become an important element in marine installations, and that the author has had considerable experience with their use inasmuch as they were fitted to almost half the engines installed, it occurred to him that some notes regarding them might be of profit.

The first installation of size which the author remembers, was one near Birmingham twenty years ago. The type of boiler fitted was the "Wilson." This was of interest because of its special design, with some approximation to contra-flow heat transfer. More interesting for marine work is one of the double-back type, which allows separate heating other than the engine exhaust. For marine work, the boiler must be available for service when the main engines are stopped; a separate oil-fuel burner is, therefore, necessary.

For gas engines the boilers have an output of 2 lbs. of steam per brake horse-power; for an oil engine, even with feed heaters, it would be less. If we take a consumption of 8,350 British thermal units per brake horse-power and 30 per cent. of this rejected in exhaust gases, then for 100 lb. pressure and assuming a boiler efficiency of 75 per cent., the quantity of steam generated would be 1.58 lbs. Is this sufficient for needs during the voyage, the other, the main oil-fuel burner, being used for port duty for the winches, etc.?

The whole question has to be very closely surveyed before any decision can be arrived at. At the present stage of development, it is most difficult to say whether it is worth while unless adopted with the elaboration of the Still engine when the grain brings so many additions to the mechanism of the engine. The view of the author is rather that if the amount of steam required for the steering engine, heating, etc., during the voyage can be met, while the port duties of unloading cargo are looked after by the oil-fuel burner, the balance is in favor further, if, due to the use of lower compression pressures (as seems likely), and air-less inspection, the main engine is arranged to be started by steam (there appears to be no fundamental reason why it should not), compressed air can be done away with, and the proposition is more favorable still.

An exhaust-heat boiler for this purpose should be simple, small in size, with probably forced circulation and arranged to lie close up to the engine; in effect, a tubular heater with a steam collecting drum above, contra-flow and fed with hot water from the cylinder head. Such a type of installation is lower in first cost and nearer in general to the usual steam installation, than the present high-pressure compressed-air Diesel engines with large auxiliaries and electric winches.

The author expressed his thanks to Messrs. Mather and Platt for the data in his paper.

PREVENTION OF CORROSION AND SCALE

The preservation of such metallic structures as boilers and condensers from corrosion is a problem with which engineers are continually contending. We understand the adoption of the Cumberland Electrolytic System for the prevention of corrosion and scale has been extensively adopted during the past few years with proved success. The system has been fitted to the Mauretania, Aquitania and to all the vessels of the Cunard post-war programme, including the Berengaria; it has also been installed in the White Star liner Majestic and a number of the company's other liners, Canadian Pacific liners, the "M" class vessels of the P. & O. Line, and vessels in the British and foreign navies.

The Cumberland system was first adopted for use in land installations and, we believe, was tried with success for the first time in the condensers of a well-known Atlantic liner. The method of fitting zinc slabs as an anti-corrosive has had long use. This method, it will generally be agreed, is anything but a success as its action is very local and therefore its preventive powers very small. The Cumberland system entirely supersedes zinc slabs. The principle on which it is based is the immersion, within the structure to be protected, of insulated iron anodes coupled to the positive pole of the source of electrical supply. Each anode is controlled by a separate resistance for regulating the current to a suitable density, and the affinity of these anodes for acid or oxygen is increased or diminished proportionate to the current supplied. The source of electrical supply is a rotary transformer of suitable capacity operated off the lighting or power current.

The surface which it is desired to protect is connected to the negative pole of the source of the electrical supply, and its affinity for hydrogen is also proportionate to the density of the current. The current flows from the positive pole, i.e., the anodes, and passes through the water or electrolyte, decomposed by the current, to the surface to be protected, returning thence to the negative pole of the system generated. The flow of current attracts the oxygen, acids and other destructive elements in suspension or solution in the water to the anodes, gradually destroying them, and at the same time forming a film of hydrogen on the immersed surface of the unit to be protected. This hydrogen not only protects the surface from corrosion, but its mechanical action between the metal and the scale carries away into solution all dirt, scale and grease adhering to it.

The cycle of chemical reaction causes the chlorine and fixed salts of calcium (and magnesium if present) to disappear and calcium carbonate and sodium sulphate is formed as an equivalent. In the case of water containing calcium chloride this will be electrolised by the current, but there will be no simultaneous formation of sodium sulphate. If the structure to be protected is free from scale, the hydrogen evolved from its surface prevents the formation of any scale or any solid matter settling or adhering to it, and also neutralises any corrosive effects due to acids, oil, or free oxygen in solution. This system when applied to circulating water pipe lines, especially where sea-water or water contaminated with sewage effluent is used, prevents corrosion and choking of the inner surface by mussels, scale, weeds, marine and vegetable growths, thus materially reducing pipe friction, saving power, and avoiding the necessity of cleaning them at such frequent intervals.

The apparatus employed comprises a motor generator, or rotary converter run off the available source of supply, transforming it to low-tension current, together with a switchboard, ammeter, fuses, adjustable resistances, switches, insulated bolts, with anodes, and all special internal ironwork adapted to the particular type of vessel requiring protection.

This gear can be conveniently installed in the engine room and insulated wires run to the boilers, condensers etc., to be protected, and once installed, is practically fool-proof.

Among the advantages claimed for the Cumberland system are that the initial cost may be stated to be the only cost as running and maintenance expenses are very low. Owing to the absence of corrosion and scale, the costs entailed by chipping and cleaning, painting, and the renewal of zinc plates, are entirely dispensed with, and the boilers and condensers can work at their highest efficiency with normal fuel consumption.

The system can also be applied to feed heaters, pumps, evaporators, tanks, pipe lines and to tail shafts and propellers.

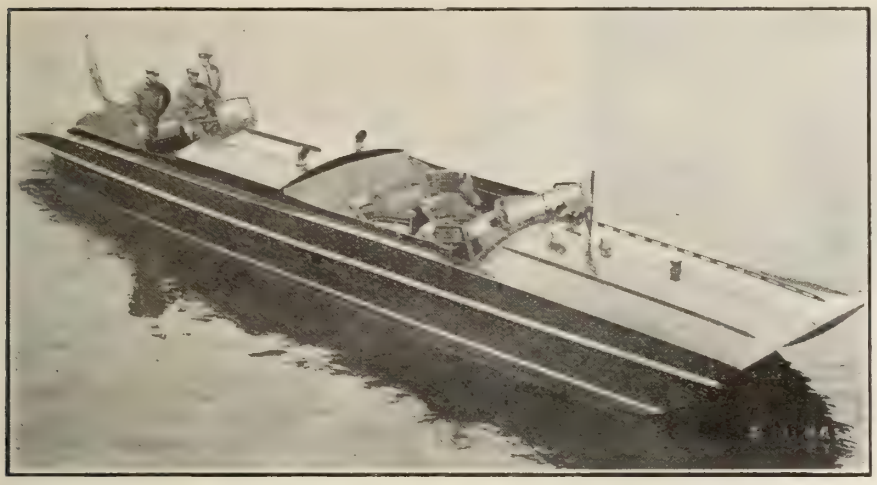
NEW SHIP ADDED TO MONTREAL LIST

A new ship was recently added to the Montreal fleet of lake vessels, named Edward L. Strong. She was built at Three Rivers to the order of the George Hall Coal Company. The new ship is for lake service and is of the very latest design and construction. She possesses a carrying capacity of 2,400 tons and when used as a grain carrier will be able to take over the canal system 78 000 bushels.

The Edward L. Strong is the third of a fleet of four built for the company this summer, the first being the N. H. Botsford, the second Frank A. Augsburg and the third the Edward L. Strong. In running to Montreal this boat made her trial spin over a given course very satisfactorily. On board the ship was Captain J. O. Grey, Shipping Master for the Montreal district.

As usual one or two finishing touches have to be added before the ship will be ready to proceed up to the lakes and this, almost certainly, will prevent her from going this season. The company expects to winter the ship in this port.

Few Ships Built But Prospects Are Promising



Sea-sled built by Canadian Vickers, Limited. This is a new type of inverted V-bottom hull, driven by surface propellers. Photo shows 36 ft. 6 in. sled, with speed of 40 miles an hour.

Activities in Canadian Shipyards Not Extensive — Outlook Is Encouraging—Some Distinct Types Turned Out—Canal Statistics Show Increase

COMPARISON of the past year's operations in the shipbuilding industry with those, say, of 1920, does not make the most gratifying kind of reading. Outside of reports, very little was done in Canadian yards. While in 1920 there were 81 shipbuilding plants reported as active, the present year has seen a large proportion of these non-existent. Such are the fortunes of war. As early as 1920, in fact, the shipbuilding industry decreased by something like $31,675,073, and since then there has been a process of elimination which finds whatever business there may be, largely in the hands of plants which were well established before the war. As to the future, the recent remark of a prominent shipbuilder would seem applicable: "To predict anything in connection with the shipbuilding industry in Canada, would require a far better prophet than I am. There will be an occasional ship for Great Lakes traffic. There will be special boats for special purposes as in the case of the 'Charles Dick,' built by the Collingwood Company during the year. The government will require a boat occasionally, and as the industry of the country develops, boats will be called for. The country's future must take waterways into consideration, and export must increase. Completion of the Welland Ship Canal will help to emphasize the importance of large ship passage to the sea. This may cause a quickening of the ship-building industry. Competition with the Old Country yards is a serious factor, but with an equalization of all conditions, colonial ship builders may have a better chance. It was undoubtedly because of lower production costs that a number of boats for Great Lakes traffic were placed recently with British yards. On the other hand, it is stated that German yards are becoming serious competitors of Old Country builders, and have already picked off a number of important contracts."

Some Comparative Figures

Referring to the world's shipbuilding, and affording a comparative slant as regards England and her Dominions and other countries, including United States, Lloyd's Register recently issued the following facts:

1. Counting only ships on which work actually is in progress, the United States is led by England, France and Holland, with Japan and the British Dominions right on the heels of the United States.

2. The United States is now building only 6 per cent. of the world's tonnage; England is building 60 per cent. and the other maritime nations 3 per cent. combined.

3. This country now has only 150,000 tons of ships in the yards; has not contracted for any new ones since last July 1, and has largely suspended work on those already on the ways.

4. America's decline since the post-armistice peak of vessel construction has been 4,036,000 tons—a goodly percentage of the decline for all the world, which aggregates only 5,346,000 tons.

5. Her shipyards are building only one-third as much tonnage as they were a year ago. Great Britain's are building one-half.

6. America is building today only 2,000 tons more of freight bottoms than she was at the outbreak of the World War in July, 1914; all other nations taking into account the wholesale suspension of building, during the last three months, aggregate 919,000 tons above the pre-war construction totals; Great Britain is building 1,200,000 tons compared with 1,750,000 she had under way in July, 1914.

Vessels Registered in Canada

Statement showing the number of vessels and tonnage on the registry books of the Dominion on December 31, 1921:

	Sailing Vessels			Steam		
	No.	Gr. Tns.	N. Tns.	No.	Gr. Tns.	N. Tns.
N. Brunswick ..	607	29,117	28,126	252	18,405	12,330
Nova Scotia	944	111,957	99,565	606	87,325	53,896
Ontario	450	125,937	133,394	624	64,467	160,614
Prince Ed. Is. ..	106	6,745	6,309	31	7,036	3,257
Saskatchewan ..	1	145	145	4	534	302
Manitoba	14	3,877	3,877	72	8,503	5,722
Yukon				4	1,204	813

During 1921, there were built in Canada 51 wooden sailing vessels with gross tonnage of 11,128; 32 wooden steam vessels, tonnage, 4,629; 74 gas vessels, tonnage, 1,509. There were 24 metal steam vessels with a gross tonnage of 92,722 and net tonnage of 55,917.

* * * *

INCREASING TRADE WILL BRING IMPROVEMENT IN SHIP-REPAIRING

By P. L. MILLER, Canadian Vickers, Limited.

MONTREAL.—Our activities during the past year may be summarized as follows:

Shipbuilding.—Completed hopper bucket dredge No. 16, 284 feet long by 48 feet beam by 20½ feet draft; fitted with twin screw triple expansion engines of 2,000 I.H.P.; speed, 9 knots; gross tonnage, 1,964 tons; for Department of Marine and Fisheries, Canada.

Constructed steel pontoon lock gate lifter for service in Sault Ste. Marie canal, for Department of Railways and Canals, Canada.

Commenced construction of hopper barge No. 3, 210 feet long by 35 feet beam by 19 feet draft, with triple expansion engines 1,250 I.H.P.; hopper capacity, 1,250 tons; for Department of Marine and Fisheries, Canada.

Str. "Charles Dick" built by Collingwood Shipbuilding Co., for a firm of sand and gravel contractors. See description in this department.

Also a number of sea sleds—a new type of inverted V-bottom hull driven by surface propellers—which possess many advantages over any other type of motor-boat. Photograph is of 38' 6" sea sled, speed 40 miles per hour, which aroused interest during demonstration trips at Montreal, Toronto and Quebec in the fall months.

Ship-repairing.—During the navigation season, 56 ships were docked and repaired. Repairs afloat were also executed on 150 other ships.

Industrial engineering.—The work in this department includes the following contracts: 36 mine cars for Teck-Hughes Gold Mines, Ltd.; one Hardinge ball mill for McIntyre Porcupine Mines, Ltd.; 8 pressure still drums of steel plate 2" thick, for working pressure of 350 lbs. per square inch, for Imperial Oil, Ltd.

The average number of men employed during the past year is 450.

With the exception of the above small vessel for the Government, no new ship construction work has been booked by this company, and practically the same condition applies throughout Canada.

Improvement is looked for in the ship-repairing business during 1923, due to the increasing international trade passing through the port of Montreal.

* * * *

THINKS OUTLOOK BRIGHTER FOR CANADIAN SHIPBUILDING

By JOHN S. LEITCH,
Vice-President Collingwood Shipbuilding Co.,

COLLINGWOOD.—The steamer "Charles Dick" is the only steamer which we completed this year. At both our Collingwood and Kingston plants we have had a large volume of repair work and have now a number of vessels in for this winter's repairs. Business therefore will be good as far as repair work is concerned. We are about to start work on a canal-size steamer, which will be ready for spring delivery.

The outlook generally for shipbuilding, we believe, is brighter. The probability is that a number of 10,000-ton type upper lake freighters will be built in the near future, the movement of this year's record grain crop showing that there is room for more tonnage. Following are particulars of the "Charles Dick."

Particulars of Steamer "Charles Dick"

Built for National Sand & Material Company, Ltd., Welland, Ontario, this steamer is the only one of her class ever built in Canada and is the last word in ships of this type. She is equipped with special pumps for loading sand and gravel and with special equipment for unloading in the shortest possible time. The ship is quite an acquisition to Canadian tonnage.

Following are the vessel's dimensions: Length over all 258 ft.; length between perpendiculars 250 ft.; breadth moulded 43 ft.; depth moulded 20 ft.; gross tonnage 2,015; deadweight 2,650; capacity of cargo department 2,000 cu. yds.

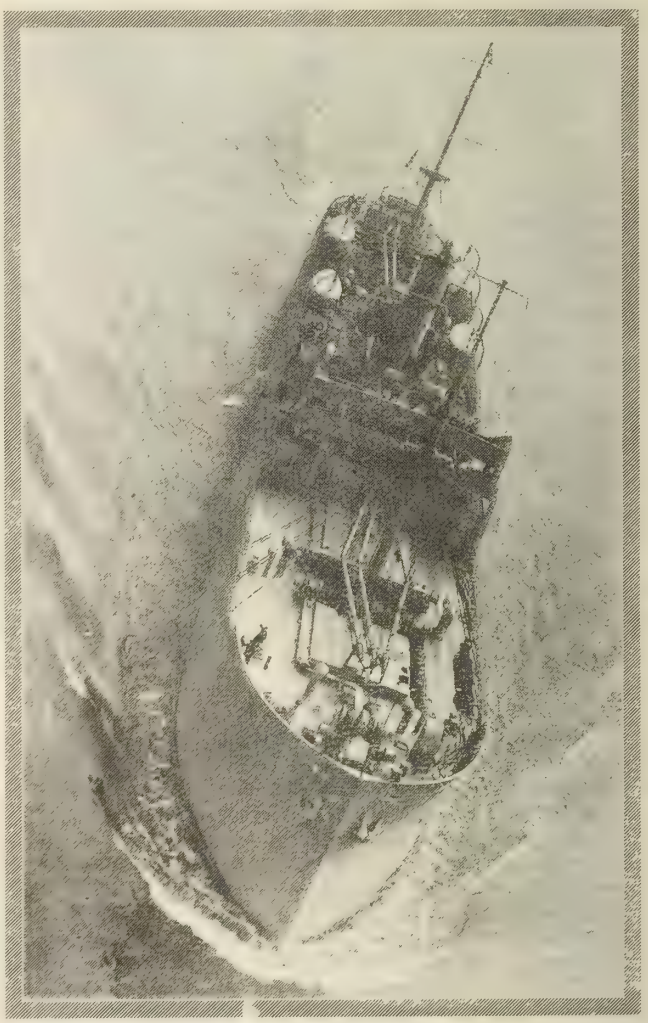
The vessel was built of steel to the requirements of the British Corporation for the Survey and Registry of Shipping. The machinery, consisting of one triple-expansion engine having cylinders 19 in., 32 in. x 36 in. stroke, and 2 boilers 14 ft. 7 in. dia. x 10 ft. 8 in. long, is placed aft. Cargo is carried in two compartments amidships and is fed into these by means of a trough with discharge openings at intervals. At each side of the cargo compartments are buoyancy spaces, closely sub-divided by watertight bulkheads. Water ballast is carried in double-bottom tanks under the machinery in peaks and in peak tank forward.

Gravel is loaded by means of two 18-in. pumps located forward. The suction pipes are connected to shell plates about 4 ft. 6in. above keel. The shell is recessed in way of suction inlets so that vertical slides for flanges of pipe elbows will not project beyond moulded line of ship.

Unloading is carried out by means of a grab bucket carried on "A" frames. This bucket discharges into hopper amidships which in turn feeds an elevator. The cargo falls from the elevator to a conveyor which lands it on dock.

The Captain and crew are accommodated forward and the officers' dining room, galley, etc., are housed aft.

Although production in agricultural implements during the past year has been considerably below normal, with comparatively limited export, the next year has its possibilities. The Massey-Harris Co., Toronto, have been increasing their force, particularly in the foundry, and it is anticipated that the plant will be running full by February.



Gull's eye view of a sea-going freight carrier. Canadian Government Merchant Marine type.
(From Industrial Digest.)

Standardisation in Shipbuilding

The Position in the United States

By E. H. Rigg.

DURING the last two decades there have been many converts to standardization; it has made stronger headway in fields other than shipbuilding, and there is almost no one to-day who will deny the value of the general principle. It is when you come to apply it to concrete cases that difficulties arise. Without standardisation, shipbuilding, as we knew it during the war, would have been impossible; the question is therefore on the extent on which it shall be carried rather than on whether or not standardization shall be adopted.

Engineering standards have been a recognized necessity for many years, though it is only comparatively recently that they have reached their present status and extent in the engineering world.

Apart from the well-known and long-established classification societies, there is a relatively new body of this nature that bears on our business to a considerable extent, namely, the British Engineering Standards Association, whose work in standardising specifications for structural materials, products and fittings entering into ship construction is decidedly more far-reaching than anything we have.

Standardisation is a large subject. The deeper one gets into it the larger the possibilities, and, as would be expected, the more impressive the difficulties.

An extremely interesting test of the value placed on standards is to ask one of our yards to build a vessel using Whitworth standard screw threads throughout. It looks fairly innocent at first, but wait till you begin writing to the makers of the auxiliary machinery, to say nothing of your own machine shop' feeling in the matter.

Standard Ships

Taking standardised ships first, as distinguished from variegated ships from standard parts: during the war we built many such standard ships; the Hog Island Submarine Boat Corporation and Great Lakes numbers and types of standard cargo vessels stand out pre-eminently as the biggest efforts along those lines. There were also other standard cargo types, but these were built in fewer numbers. The vast numbers of submarine chasers are another instance, also the large number of destroyers built for the United States Navy.

The cargo vessels above referred to were laid down to meet a war need, it is true, but they remain distinct from the strictly naval vessels. As one effective answer to the submarine of the enemy, they, without doubt, fulfilled their object. The 7,825-ton Hog Island boats are a more generally useful type than the submarine boat 5,075 tonners or the Great Lakes 4,200-ton steamers, useful as these smaller vessels are in such localities as the Baltic and on the short-run trades.

That we shall again witness such an effort is not probable; further, that this effort has helped to put a quietus on general cargo vessel construction for some time ahead is also to be admitted. As an example of standardised work which justified its conceivers, there is no doubt that it did more than make good; while there were differences in detail in these groups, such minor differences did not alter the status of the ships as standardised products. These detailed differences sometimes indicated progress, but were in many cases unjustifiable and extremely annoying to the builders; they serve to emphasise one of the main arguments against standardisation, namely, that it prevents progress. Automobiles are standardised, but that does not prevent improvements being made in the 1922 over the 1921 model. In the same way, succeeding ships for a particular trade can and do embody improvements over the earlier ones.

The situation for standard ships would appear to be as follows: In emergency, when large numbers of ships are wanted in a hurry, by all means build to a standardised design. When all are building in one yard this holds absolutely; when building in several yards it holds in general, with the qualification that each yard should be allowed to adhere to its own general way of doing business and to work to the same general plans and specifications in its own way, with freedom as to details. This can be qualified to say that full consideration should be given to a yard having plans, etc., available for a vessel substantially equivalent to the proposed standard ship.

Main and auxiliary machinery should be common to all ships of the type and, therefore, interchangeable from ship to ship to a very large extent; this has helped deliveries frequently when a broken part in an earlier ship can be taken from a later vessel.

Wholesale Standardisation Not Expected

As a normal proposition, wholesale standardisation of complete ships is not to be looked for. It cannot be denied, however, that there are so many tramps of certain deadweights as to very closely approximate standardisation. The large class of 7,000 to 8,000-tonners, is worth noting, even though we have variety in detail to suit different builders' and owners' ideas.

When repeat orders are given for a vessel already built, the work is thus partly standardised. There are many instances of this on record; a type proves satisfactory in service, and may be repeated at intervals in groups as many as fifteen or twenty times, with only minor and detail changes. The work is thus spread over a period of years, so that the advantages due to repetition work in the shops do not enter into the consideration. The main advantage is in time, because the design, plans, material-orders and specifications are immediately available.

Oil and cargo ships come in the repeat-order category rather than passenger ships. The Shipping Board 535-foot passenger ships were an example of a large number of ships laid down to the same original plan as troopships, but finished up in groups for several lines and services as passenger ships. The hulls were practically identical, but even here changes were made to get different oil-fuel capacities; the machinery was built in groups to spread the work to different boiler, turbine and gear plants, so there was only partial standardisation in machinery. The passenger accommodations were most wide of "sameness."

While it is misleading to say that no two ships were alike, it is fair to say that with sameness of outline plans we have very considerable differences in detailed arrangements and decorative schemes, so that these differences finally resulted in a fleet wherein there were greater or lesser differences in every ship. Arguing from this and from general experience, standardisation of passenger ships may be dismissed from serious consideration, except in quite small groups. Shipbuilding, in the nature of things, does not lend itself to standardisation as a whole, but to build large ships in groups of limited numbers, suitable to particular trades, is a practice as old and older, than anyone living to-day.

There is a large field where more has been accomplished than meets the eye on first approaching the subject, namely, international agreements on such matters as rules for avoiding collisions, signal codes; tonnage laws; lifeboats, and subdivision of passenger ships. Working agreements between classification societies in different countries tend toward broad-gauge standardisation. Standard loadline regulations are well on the way to international scope. Agreement to recognise each others' inspection certificates covering passenger and crew accommodations between countries having substantially the same regulations is another step towards the common goal.

The tendency towards international codes covering the fundamentals of ship-

ping both as to building and to operating is right and proper, particularly when it is remembered that the high seas are world-wide and provide highways common to all nations. The sea does not ask if a ship be American or French, but treats them all alike; hence the growing volume of international standardisation of fundamentals is to be welcomed and helped as a means of getting along better with international intercourse and trade.

Standardisation of Materials

Turning to the standardisation of parts entering into ship construction, we find much to study. We also find great progress to record. We even find some progress towards international standardisation, though this phase of the problem has naturally not progressed nearly as far as international covenants covering broad principles.

Consider the steel of which ships are nowadays constructed. Wood, iron and concrete need not be considered here, because merchant shipping to-day is, to all practical intents and purposes, universally constructed of steel.

International specifications for ship steel have not yet arrived in spite of efforts which were under way when the war broke; the difficulties are great, and they begin in the mines where different ores have different characteristics and properties. An universal specification is difficult to draw that would avoid undue favor to some mills as compared with others. American, British and German steels have their own characteristics, but given a willingness to co-operate, it should not be impracticable to draw specifications broad enough to cover a merchantable article satisfactory for use the world over. One great question is: Can genuine willingness to agree, if possible, be obtained? Without at least that as a basis, it is no use trying for international steel standards.

During the war, considerable progress was made towards international standard rolled sections, such as angles, channels and bulbs; this as between America and Britain. Here we have two standards, structural shapes and ship shapes, these ship shapes being identical with the British except in minor points; there they have one set of standards for bridges, buildings and ships.

There is considerable opinion in favor of a single standard here. The manufacturers fear scrapping of equipment before it is worn out; the answer is that properly regulated standardisation is not an overnight affair and will involve no scrapping of good equipment.

The [illegible] and metric units introduce a trouble when considering international standards. The obvious way to get around it is by printing two columns parallel to each other; customers in metric countries can use the one in which they can think best. The metric system, or lack of it is no bar to international standards, though it is an added difficulty which benefits the printing trade more than anything else.

Since the war, progress towards international rolled steel standards is to be noted on the part of Australia, Belgium, and France, as well as between ourselves and Britain. Plain angles present few difficulties; the channels, bulbs and I-sections are the crux of the matter. Standardisation of what we may term secondary ship materials such as brass, bronze, iron and wood, is also to be kept in mind.

The Desire For Co-operation

Again a real question is: How willing are the different parties to go at the matter and find a solution that will give the best sections designable and commercially manufacturable at this date? Without this willingness, we are merely beating the air.

The war has done at least one good thing: It has taught us that undertakings before considered impossible can be put through provided the will to accomplish is there; that men and women of many races can forget petty differences and work together for a common goal. Whether broad-gauge sentiments similar to those inspired by the stress of war can also be invoked for peace-time objects is at least open to debate, especially in the present condition of world affairs.

The transition stage would have its troubles; the present state has its disadvantages. The same solution for steel specifications, both as to composition and dimensions, as has already been applied to such matters as tonnage, safety regulations, etc., would appear to the writer as the proper one, namely, broad-gauge standardisation on an international basis with equitable leeway to each nation as far as individual peculiarities are concerend, such as extend from mine to finished product.

In developing new countries, is it an advantage or a disadvantage to have similar structures and equipment built to varying specifications, and to whom do the advantages and disadvantages accrue respectively?

Standardised Methods

Regarding standardised methods of production, shipyards are organisations sub-divided into many departments or trades. They are not unaware of what is going on in the general industrial world in the way of advanced methods. There are at least two good reasons why the practices of factories, pure and simple, cannot be fully applied; one is the diversity of product as between ship and ship, and the other is diversity of parts entering into any one ship.

What all efficient yards are doing, particularly since the present depression set in, is to so organise their methods as to adopt for each shop the best that can be worked in. We all have certain routine ways of doing things. In a poor plant the routine runs the plant for a certain or uncertain season; in a good plant the routine is modified and improved conservatively and constantly in such a way as to cut down work, save time and labor, eliminate duplication, and also secure harmony and effective intermeshing of departments.

Too much departmentalisation will kill any shipyard. You all know the small-minded departmentalist who cares not what happens to the department on each side of him just so long as his particular department makes a good showing.

Modern established yards have their own standard ways of handling work; from design to delivery, standard forms and methods are used. These should only be changed conservatively, and after the management is sure that they have all the cards on the table; a change made to suit one noisy departmentalist will almost surely bring trouble and can very easily change a profit into a loss on the completed ship. We also have standard specifications. For yards handling more or less one line of work, this is undoubtedly correct; for yards with a diversified product it is still correct, but cannot be made to work without greater labor in adjustment to particular cases.

These specifications should follow in arrangement the yard charge and plan numbering system, so that an index is unnecessary to one familiar with the system, thus saving more time for more people than will be realised. The index should be there for convenience of owners and others not acquainted with the system.

It seems hardly necessary to say that all forms and drawings should be uniform, also all calculations, material orders and correspondence methods. The responsibilities and limitations of each department should be clearly defined and no point left in the air to fall hapless between two or more parties.

Standard Details and Fittings

We now come to standard details. Each established yard now has its own standards and each owner has his own particular requirements. Each yard wants to use its own standards, which works for a cheaper ship.

The British have decided that there is no good reason why a lot of fittings and equipment cannot be nationally standardised and, having decided so, they are doing it. There is a host of fittings that lend themselves to this treatment, as manholes, airports, doors, davits, boats, bitts, cleats, chocks, sanitary fittings, winches, windlasses, anchors, chains steering gears, etc., down to minor fittings, such as cups and saucers. Providing the standards are of a good quality and agreed upon by the jointly interested parties, why not eliminate as much special work as we can? This British experiment is well worth noting as we press on our way to the building of ships economically.

With standardised fittings it is easy to see both time and money saved; stocks can be kept fuller without fear of loss.

Standard Machinery

With reference to machinery, we have just arrived at standard specifications

for moderate-powered, reciprocating-engined, Scotch-boilered cargo boats. We arrived there, however, in the midst of the modern upheaval in methods of propulsion; the claims of Diesel drives, Diesel electric drives, electric hydraulic or mechanical reduction-gear drives, direct-turbine drives, watertube boilers versus cylindrical, also last, but scarcely least, the war.

The standard specifications here referred to are those prepared in Britain with a view to harmonising classification and Governmental requirements for main engines and boilers and giving to builders one set of rules and specifications to work to. What success has attended their practical working is not known to the writer.

The reconciling of classification and Governmental requirements where these overlap is something which will save time and money; the application of two or three formulae to figure out the same dimension involves duplication of effort and, consequently, waste.

Motors for ship propulsion are a modern development. We already find elaborate standardisation here for several reasons; with uniform power per cylinder, engines of four, six, or eight cylinders are built. Oil engines are complex affairs at the best; the more parts to a given design the lower the already high cost per unit of power can be kept. Further, their manufacture commenced at a period when the benefits of standardisation were already realised.

Electricity plays an increasingly important part in the auxiliary installations aboard ships. This industry is already highly standardised. The requirements of land and sea services should be brought as nearly to a common basis as is practicable.

Repairs and Upkeep

The importance of quick turn round in ports needs no emphasis before this body. The advantages of standardisation in giving owners and repair plants a reasonably generous stock of spares to draw upon is obvious. With greater standardisation in building, especially in machinery, we automatically get advantages in the matter of prompt availability of parts for repairs and renewals, the economy of which speaks for itself. The more general the standards, the fewer and less expensive the spare parts each individual ship will need on board. Certain parts liable to be needed at sea will always have to be carried, but stocks at terminals can be kept lower without danger of delay to the ship.

Standardisation is a natural and inevitable corollary of modern industrialism; mechanisms are both more elaborate and more generally used than formerly.

Uniform Requirements

The codification of Governmental requirements for merchant vessels under one set of regulations should be aimed at; at present these are scattered and come under different departments for enforcement.

The reconciliation of the requirements of two or more bodies with concurrent jurisdiction is very important. The most outstanding case is perhaps that of boilers, the U. S. Steamboat Inspection Service and the Classification Societies each having their own formulae. The success which has attended the adoption of the A. S. M. E. Boiler Code for land work needs no emphasis.

That the practical benefits of uniform requirements on an international basis are not lost to sight is evidenced by the recent reports of the Committees appointed by the International Shipping Conference last November. These reports mark a step towards agreement on four important questions connected with shipbuilding, namely, life-saving appliances, wireless telegraphy, load line, and passenger ship subdivision. The absence of United States representatives on these committees is to be noted, the writer feels, with regret.

Uniform standards of strength for ocean-going vessels may well be considered; the proposed international load-line regulations give us a basis. The various classification societies each have their own; in practice they are fairly close to uniformity. The extent to which their rules could with advantage be standardised might well form a subject for future discussion.

*Abstract of a paper read before the Society of Naval Architects and Marine Engineers, New York.

Through the courtesy of J. J. Tait, Superintendent Engineer of the Canadian Government Merchant Marine, Ltd., we are enabled to publish the following list of new appointments of Chief Engineers, made since November 17, 1922:

W. Geddie to be Chief Engineer of S. S. "Canadian Voyageur."

C. Christian to be Chief Engineer of S. S. "Canadian Volunteer."

E. G. Rankin to be Chief Engineer of S. S. "Canadian Coaster."

W. Fotheringham to be Chief Engineer of S. S. "Canadian Squatter."

THE GOVERNMENT MARINE

Among the important issues to be put up to Sir Henry Thornton for decision is the future of the Canadian Government Merchant Marine. The late Board of Directors had decided to sell 27 of the smaller vessels, those from 3,000 tons up to 5,100 tons, and operate the remaining thirty-five or six. But no action was taken, in view of the change of management of the National Railways, in order to give the new head complete freedom to decide upon railway and shipping policy together.

Last year, the Government Merchant Marine showed a deficit of about eight millions. Cargoes have improved in 1922 but rates have gone down and the net result of the operation of the fleet is not likely to be more satisfactory. The British service is not paying well, on account of shortage of cargoes for Canada; the West India service is also not very profitable, though rates have held up much better. The best part of the service is that from Vancouver and Eastern Canada to Australia and the Orient. Indeed, except for complementary advantages to the National Railways, the British service might apparently be well left out, because the Atlantic routes are thoroughly served at present. However, the addition of the Government marine to the all-Canadian service has brought a lot of business to Canadian ports, encouraged direct importation and exportation, and sustained business. In British Columbia, for instance, are 45 lumber mills depending largely on export trade. The Eastern Canadian market, including the Prairies, is dead. These mills could not have kept going, had they not had the National Marine service. The export of lumber increased from 75,000,000 feet in 1919 to 165,000,000 feet in 1921, and in 1921, the Government freighters carried 85,000,000 feet of this. The lumber rate in 1919 to Australia was $41 per thousand, and the last half of 1922 $14 a thousand. The profit was almost nil, on the transportation, but British Columbia almost lived on this service.

The drop in rates between the period when the Government marine went into commission, and now, has been from 50 to 80 per cent. Flour to the United Kingdom is 20 cents per hundred, compared with $1, general cargo 60 cents. compared with $1. Apples are $1 a barrel, compared with $3. These great drops, when costs are almost the same, and interest at 5 per cent. is charged against a capital cost of about $190 a ton, have an inevitable consequence—a considerable deficit. Yet eight of the small ships have carried millions of bushels of wheat in the Great Lakes in the last two months. two 10,500 vessels are crowded to capacity with cargoes for Australia from Eastern Canada, and other service is being rendered that no other freighter fleet would give. Even if the operation has a deficit, on the Government records, the export and import business of this country is benefiting largely through the added transportation facilities of the fleet.

NIAGARA FALLS

A strong effort will be made by prominent local men to have the government make the Welland River or Chippawa Creek navigable so that ships could come from the Welland Canal into the river and dock at either Montrose or Chippawa. The scheme in brief calls for one or two plans, one to have a large lock at Port Robinson and dredge the river to a navigable depth and the other a lock at Montrose. The latter is regarded by engineers as the more feasible on account of the high cost of dredging. Some land would be flooded but it is believed the land damages would be light in view of the more valuable frontages afterward.

Welland Ship Canal Great Lakes-to-Ocean Link

Work on Stupendous Engineering Project Carried on Vigorously During Year—About 2,000 Men Engaged—Will Be 25 Miles Long With Seven Liftlocks—Over Thirty Millions Expended

By ALEX. J. GRANT,
Engineer in Charge.

DURING the year construction work on the Welland Ship Canal has been carried on vigorously on Sections 1 to 5 inclusive, which are now under unit price contracts. J. P. Porter has the contract for completing Sections 1 and 2; Peter Lyall & Sons Construction Co. for Sections 3 and 4, and the Canadian Dredging Company for Section 5. These Sections extend from Lake Ontario entrance to Port Robinson, about 14½ miles in length, and include all the lift locks and most of the other important structures. No construction work has yet been done on the remaining portion of the canal extending from Port Robinson to Lake Erie.

During the current year, on Sections 1 and 2, nine of the large concrete cribs required for the docking at Port Weller harbour, Lake Ontario, were constructed and placed in position. The harbour is being dredged and the embankments on each side are being built with excavated material. Concrete is being placed at Locks 1 and 2 and their weirs, and these structures are nearing completion. Excavation work is being carried on in the canal prism south of the Queenston Road and to some extent elsewhere on the sections. About 820 men were employed during the year, but the force is now somewhat reduced owing to curtailment of concrete work with the approach of winter.

On Sections 3 and 4, excavation of the canal prism north of Lock 4 and throughout the greater part of Section 4 is being done. Concrete work is well advanced on Twin Locks 6 and a small amount has been done on Lock 7. The re-location of the Welland Division of the Grand Trunk Railway on Section 4 has been graded, ballasted and track laid and operation over the diverted line will probably begin in April, when it is expected a couple of necessary structures will be completed. About 840 men have been employed on these sections during the year.

On Section 5, dredging operations are being carried on and the substructure of Bridge No. 12 is nearing completion. This section is nearing completion. About 170 men represent the average number employed during the current year.

The Parliamentary Appropriation for the fiscal year ending 31st March, 1923, amounted to $8,000,000 and about $5,000,000 of this has been spent to the end of November.

Details of Ship Canal

The Ship Canal as finally located, follows the valley of the Ten Mile Creek between its mouth (Port Weller) about three miles east of Port Dalhousie, and Thorold, crossing the present canal below Lock No. 11 where the level of both canals will be at an elevation of 328.0. Between Thorold and Allanburg a new cut will be made for the purpose of straightening the alignment of the canal between these points.

The Ship Canal will cross the present canal below Lock No. 25, where the water levels of both canals are at elevation of 568.0, the extreme low water level of Lake Erie. From Allanburg to Port Colborne, it will follow closely the course of the present canal. The total length of the canal will be 25 miles, and for all practical purposes of navigation, it is a straight line throughout. The difference in level between the lakes will be overcome by seven locks of 46½ feet lift each. The direct line of the canal down the face of the escarpment, and the topography of the lower plateau permitted the adoption of these high lifts which constitute a peculiar feature of the design of the canal and has no precedent in actual construction for locks of their size.

The canal will be made 200 feet wide on the bottom, with two to one slopes and, for the present, will be excavated to a depth of 25 feet only. All structures, however, will be built for 30 feet depth, so that the canal, at some future date, can be enlarged by simply dredging out the canal prism and harbour entrances.

Some of the dimensions and notable features of the canal are as follows:

Number of lift locks	7
(Three of which are twin locks in flight similar to the Gatun Locks of the Panama Canal).	
Useable length of locks	820 ft.
Useable width of locks	80 ft.
Depth of water on mitre sills	30 ft.
Lift of locks	46½ ft.
Height of lower mitre gates	82 ft.
Width of bottom	200 ft.
Width at water line	310 ft.
Navigable depth of canal (all structures built for 30 ft. depth)	25 ft.
Weight of each leaf of lower gates	425 tons
Total estimated weight of metal in lock gates and their machinery	12,300 tons
Total estimated weight of metal in valves of locks and weirs and their machinery	3,200 tons
Estimated connected motor load for operating and lighting canal and Port Colborne elevator	11,200 h.p.
Time required to fill a lock	8 minutes
Estimated time for vessel to pass through canal	8 hours
Total rise	326½ feet
Length	25 miles
Number of railway and highway bridges across canal	22

Quantities

Earth excavation	Cu. yds.	40,200,000
Rock excavation	Cu. yds.	6,740,000
Watertight embankments	Cu. yds.	2,700,000
Concrete (all kinds)	Cu. yds.	2,850,000
Steel reinforcing	Lbs.	18,500,000

The estimated cost of the canal at 1912 prices was $50,000,000. For the purpose of construction the work was divided into nine sections and contracts were awarded for the construction of Sections 1, 2, 3 and 5 in 1913. The first three sections include the Lake Ontario entrance (Port Weller Harbour), the seven lift locks, eight bridges and the canal prism between the lake and Thorold.

Owing to the European war, the work on the canal practically ceased in 1916. In March, 1917, it was entirely closed down and the contracts cancelled in 1918. After the armistice of November, 1918, the Government decided to resume work on a small scale on Sections 1, 2, 3 and 5. During 1919 and 1920 it was continued in a more or less intermittent manner due to want of materials, labour troubles and other causes.

During 1921 the work of completing Sections 1 and 2 combined and Section No. 5, with a small portion of Section 4 added, were re-let on a unit price basis. The contract for the former was awarded to J. P. Porter and for the latter to the Canadian Dredging Company and in June, 1922, Section No. 3 and No. 4 were re-let on the same basis to P. Lyall Construction Company.

The expenditure on the Ship Canal to the 31st March, 1922, including surveys, engineering expenses and right-of-way, amounted to $30,588,026.07, less value of plant sold and to be sold $4,254,300.24 leaving a net expenditure of $26,333,725.83 which includes some other redeemable assets.

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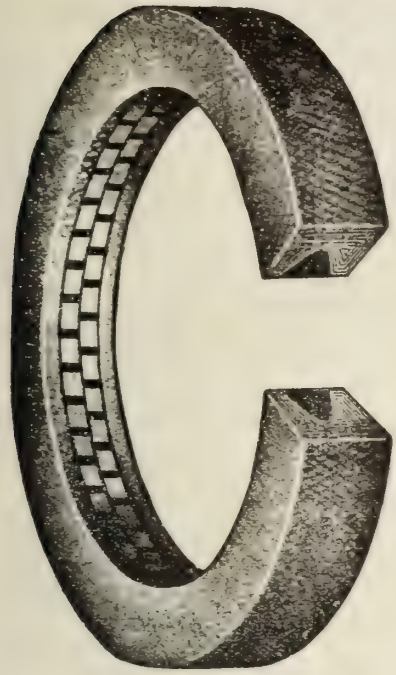

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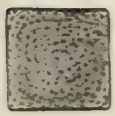

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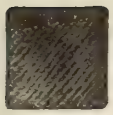

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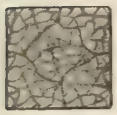

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DECEMBER, 1922

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INTRODUCTORY

W. B. ROBERTS

W. B. Roberts, who succeeds T. H. Fenner as editor of this paper, comes exceedingly well qualified to assume the duties and responsibilities of the position. To the readers of this paper, it will be of particular interest to know that Mr. Roberts' engineering experience has covered a very wide range and of a very exceptional character. After sailing out of Liverpool for a number of years, he obtained his Extra Chief Engineer's Board of Trade Certificate. In 1908 he became associated with a firm of consulting engineers, first as surveyor and latterly as resident consultant to the company. He was with them for five years, where he was in the unique and favorable position of observing numerous tests conducted with a view to promoting greater economy in the application of steam.

Mr. Roberts' subsequent experiences have brought him into close touch with Canadian engineering and shipping activities, whilst living at Port Arthur and Vancouver.

In his late capacity as chief engineer and manager to the Boiler and Engine Department of the General Accident Assurance Company, Toronto, he was kept well informed in respect to the developments of all engineering matters. His close association with Halifax, St. John and Montreal, and his constant visits to these towns placed him in the favorable position of knowing the actual conditions at these places relative to harbor facilities and shipping.

During the war Mr. Roberts added a very interesting chapter to his career. In 1915 he was chief inspector out west for the Canadian Casualty and Boiler Insurance Company. He left his position temporarily to join His Majesty's Navy. The manager of the company on that occasion wrote: "It is with great regret that we permit him to leave temporarily but his country calls him. He is very highly qualified as an engineer, holding an extra chief's certificate, and he wishes to obtain a position in the Navy where his services can be used for the good of the Empire." Subsequently Mr. Roberts joined the Navy as Engineer Sub-Lieutenant, but was quickly raised to the rank of Lieutenant and in March, 1919, he was gazetted Engineer Lieutenant Commander.

For a period of twelve months he was engaged in the Clyde district supervising the construction of twelve new vessels for the Admiralty. This programme was successfully carried through from the laying of the keel-plate, conducting the necessary tests, eventually running the final trials. Engineer Commander Wallace writes: "He displayed great tact in dealing with the various engineering firms concerned and so expedited the completion of these ships when they were urgently required. Mr. Roberts has shown himself to be a clever and capable engineer and a good organizer."

On the completion of his work in the Clyde district, Mr. Roberts was appointed to the Portsmouth Base in charge of repairs. Some of his experiences here were unique in view of the fact that he was effecting repairs under great difficulties during the steel shortage..

During the period of his sea service he was chief engineer on six different H.M. vessels, the reason for this being that he was unfortunately regarded as "trouble-man" and was therefore being constantly changed to the vessel where the trouble was thickest. This was during the period of the war when our merchant shipping losses were heaviest and therefore every H.M. vessel that could be possibly kept in commission was kept at work.

THE ANNUAL LAKE TOLL

We, as a nation, are well to be proud of the heroism of our sailors, who undertake the navigating of our lake ships at the close of each shipping season, but are we not shirking our responsibility by instituting some means to give them better protection? We have legislation pased to protect our workmen under the Factory Act and similar legislation for the protection of the miner. But the sailor—what protection has he? We are afraid the incentive of the shipowner is to risk the treacherous December storms to secure the higher freight rate, but are they justified in exposing our sailors to the unnecessary risk, on this account. Life should be considered first and foremost in shipping as in all branches of industry and commerce, and if there is no other alternative but for these vessels to continue working until the bitter end of the season, ample and special provision should be made for the safety of the ship's crew.

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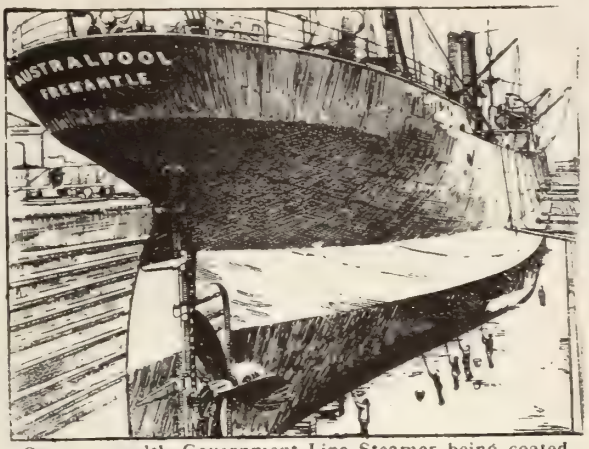

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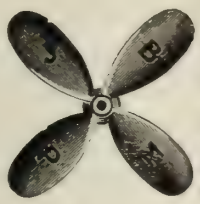
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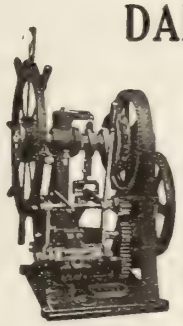
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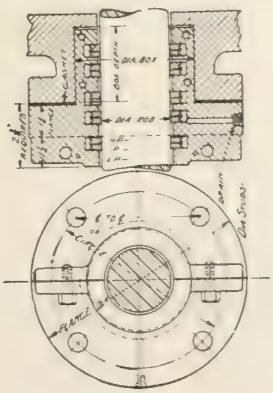
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Marine News From Every Source

British Columbia.—At the termination of the whaling season this year, it was found that the total catch was 187 whales.

* * * *

Seattle.—Upon the arrival of a small halibut vessel recently at this port, the fishermen each received $505 for two weeks' work.

Alaska.—In the early spring clean-up of the far northern mining camps, the Victoria on her last trip brought $750,000 in gold bullion.

British Columbia.—The Salmon catch for this year amounted to 1,017,696 cases much of which has already been shipped to Australia and the United Kingdom.

Brockville.—Navigation on the St. Lawrence was officially closed Dec. 15th when the Canadian Government Steamer Scout picked up the various gas buoys in the Brockville Narrows.

Brockville.—Owing to ice forming in the canals before they were able to negotiate a passage the tugs Sin Mac and McNaughton of the Sincennes-McNaughton Line, Montreal, with several barges, have been forced to tie up at the head of the Galoups Canal for the season.

Seattle.—The General Petroleum Co. have leased a 2,500,000 gallon oil tank from this port to establish a fueling station. This company will furnish fuel oil for shipping board vessels and extensive improvements and increased facilities are to be installed at the Smith Cove terminals. The fueling wil be effected by barges.

Vancouver, British Columbia.—A new phase of Australian-Canadian trade has recently developed in the shipment by the July, August and September mail steamers of 6,757 cases of oranges from Australia to Vancouver and Eastern points, where they are reported to have realized satisfactory prices and created a demand for further shipments. It is hoped that this trade in oranges with Canada will become permanently established.

Montreal.—The Eastern Steamship Co., who just recently secured incorporation here, are to provide increased facilities for grain carriage by the St. Lawrence route. American grain shipping interests are behind this incorporation, which has placed an order for ten steel steamers of the canal size to operate next season between Buffalo, Port Colborne and Montreal.

* * * *

St. Lawrence Canals.—Total traffic aggregated 651,251 tons as against 479,033 tons last year. Corn and oats declined but wheat shipments increased 223,944 tons or 7,404,800 bushels. Anthracite coal increased 37,796 tons but bituminous coal was 1,999 tons below last year's shipments. General merchandise increased from 14,849 tons last year to 26,277 tons.

* * * *

Welland Canal.—Total traffic showed an increase of over 28 per cent. due almost entirely to increase in wheat shipments which amounted to 326,349 tons or 10,878,300 bushels as against 3,403,300 bushels for October 1921. Corn shipments decreased 66 per cent.; oats also showed a decrease. No anthracite coal passed through the canal and bituminous coal fell off 57,826 tons.

* * * *

Lulu Island, near the southeastern point of the British Columbia mainland, has been recommended as the site of a new wireless station of exceptionally powerful capacity to be established in the near future by the Pacific Cable Board in conjunction with the Canadian Marconi Company. A six months test of the wireless possibilities of the Pacific will be made at the end of the cable at Bamfield, Vancouver Island, according to officials of the Cable Board. Apparatus will be installed in a few weeks.

* * * *

Sault Ste. Marie Canal.—Traffic through the Canadian and American locks showed a large increase over October 1921, aggregating 11,332,198 tons compared with 6,650,811 tons last year. Wheat increased 14,932,210 bushels, iron ore increased 2,696,412 tons and bituminous coal increased 1,478,053 tons or over 120 per cent. The total of bituminous coal passed up through the canals this season was 5,961,080 tons compared with 11,979,596 tons for the same period last year and 12,507,027 tons for the 1921 season of navigation.

* * * *

Vancouver.—The Hon. J. H. King, Minister of Public Works, recently made an inspection of the grain shipping facilities and other developments at Montreal, with a view to obtaining information in connection with developments at Vancouver. The Vancouver Harbor Board are to visit there shortly after the New Year to make an inspection of the port facilities and until such time no development can be made. Before construction can be proceeded with, funds must be voted by Parliament and this cannot be done before the coming session.

* * * *

Montreal, Quebec.—Grain shipments through the port of Montreal this season will total close on 160,000,000 bushels, it is predicted by Dr. W. L. McDougald, president of the Harbor Commission, who declares that over 147,500,000 bushels have already been handled here this season. Preparations were made at a meeting of the Commission for starting at once the new elevator at Tarte Pier. The first unit of this elevator is to have a capacity of at least 4,000,000 bushels, and will be ready for use by October 23, 1923. Ultimately the elevator will have a capacity of 10,000,000 bushels.

* * * *

Goderich.—With the arrival on Dec. 17th of the Turret Crown, the fleet Wintering here will number fourteen, as follows:—Turret Crown, P. W. Sherman, Sarnian, Home Smith, Laketon, Bayton, Canadian Signaller, Valcartier, Brookton, Canadian Pathfinder, Canadian Sailor, Canadian Warrior and Riverton.

The Berryton and the Canadian, with the possibility of two or three more, are also expected, providing the ice conditions are not too serious. With the arrival of these others, this will be the biggest fleet that has wintered here. Some of the boats will undergo considerable repairs. The Turret Crown, which was a mass of ice when she made port, reported having had considerable difficulty in the ice in the river.

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BRITISH PORTS

(Continued from last issue)

Hudson Dock North and Hudson Dock South are approached through the North Half Tide Basin, which is 420 feet in length and 260 feet in width, with an area of 2½ acres. The width at entrance is 70 feet and the depth on sills at H.W.O.S.T. 30 feet, the length of quayage available being 800 feet. The Hudson Docks have a total water area of 41½ acres, and are 2,800 feet in length and 700 feet in width, while 9,000 feet of quayage are provided, and there are five jetties. The entrance from the Half Tide Basin is 65 feet wide, and has a depth on sill of 28 feet at H.W.O.S.T. On the west side of this dock there are numerous staithes capable of shipping considerable quantities of coal daily. The docks are equipped with three warehouses with a capacity of 50,000 quarters for the storage of grain and breadstuffs. There are also sheds and storehouses for general merchandise and electric, steam, and hydraulic cranes, and other handling appliances, including sheers capable of dealing with weights up to 60 tons. The plant for discharging grain is thoroughly up to date, and the cargo is taken from the ship by a pneumatic elevator and distributed by elevators, belts, and spouts. An iron tower 60 feet in height runs on quayside rails and can be placed alongside any ship. The grain is drawn up into the tower and is automatically weighed and discharged on a travelling band underneath the ground floor of the warehouse, whence it is raised in a bucket elevator to the top floor, from which it can be distributed to other floors as required. It is estimated that discharging and storage can be done at the rate of 100 tons per hour.

Sunderland is one of the greatest shipbuilding centres in the world, and at the docks and on the banks of the river there are shipbuilding yards, marine engineering works, and other industrial enterprises.

Products of local industry exported in addition to coal and coke are iron and steel rails, pig iron, machinery, firebricks, clay, cement, earthenware pipes, lime, paper, slag, coal tar products, and glass manufacturers, while the imports consist of timber, for the storage of which extensive yards are available, iron ore, grain, esparto, ice, tar, woodpulp, petroleum, hemp, slates chalk, etc.

The total water area of the docks, the harbour entrance, and the South Outlet is 211 acres.

Swansea

This is a great metallurgical centre and is an important bunkering port in the Bristol Channel. Of the large ports in the Bristol Channel, Swansea is the nearest to the Atlantic Ocean, and is situated in the heart of the great anthracite areas of the South Wales coalfields. The harbour is commodious, sheltered, and safe; the docks are extensive and modern, great developments having taken place in recent years so that the largest class of vessel is now accommodated. The port is an excellent distributing centre for the populous districts of South Wales, the Great Western, London and North-Western, Midland and other railways having direct access to the port. It is one of the principal outlets for the products of the Midlands and is the home of the British tinplate trade, the total shipments of tinplates and galvanized sheets amounting to as much as 500,000 tons per annum, in fact, roughly, three-fourths of the tinplates produced in Great Britain are made at works within 20 miles of Swansea. The port is rapidly developing as one of the greatest oil ports in the British Isles, and extensive facilities are being provided for bunkering vessels using oil fuel. At the new jetty adjoining the entrance to the King's Dock, the largest liners will be able to replenish their tanks at any state of the tide. The hydraulic shipping appliances are modern and efficient, and are capable of bunkering and loading steamers with a maximum speed. For the general imports and exports, there is an excellent range of cranes and other loading and discharging equipment, capable of dealing rapidly with all classes of bulk cargoes and miscellaneous traffic of every description.

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